(26,684)

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1918.

No. 598.

BUTTE & SUPERIOR COPPER COMPANY, LIMITED, APPELLANT,

vs.

CLARK-MONTANA REALTY COMPANY AND ELM ORLU MINING COMPANY.

APPEAL FROM THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE NINTH CIRCUIT.

INDEX.

	Original.	Print
Caption	*a*	1
Names and addresses of counsel	1	1
Transcript of record from the District Court of the United States for the District of Montana	1	1
Bill of complaint	2	2
Exhibit A—Notice of location, Elm Orlu claim	17	10
B—Notice of location, Black Rock Lode claim.	19	11
C—Diagram of Jersey Blue, Elm Orlu, and Black Rock Lode claims	21	12
Subpœna	22	13
Memorandum pursuant to rule 12, Supreme Court U. S.	23	13
Marshal's return of service of subpœna	23	14
Answer	25	14

JUDD & DETWEILER (INC.), PRINTERS, WASHINGTON, D. C., SEPTEMBER 20, 1918.

	Original.	Print
Exhibit A—Agreement between Clark-Montana Realty Company and Amasa P. Peake, October 29, 1906	48	27
Reply	52	29
Findings of fact by the court	59	33
Decree	61	34
Opinion, Bourquin, J	70	39
Stipulation as to record on appeal	117	61
Stipulation settling evidence	119	63
Stipulation as to exhibits	120	63
Stipulation extending time to file bill of complaint	122	64
Stipulation extending time to file answer	123	65
Stipulation as to amendment to bill of complaint	124	66
Stipulation filing stipulation concerning operations, &c	126	67
Stipulation concerning operations, &c	127	67
Assignment of errors	131	69
Petition for appeal and allowance	141	76
Bond on appeal	144	77
Stipulation as to bond	151	80
Citation and service	153	81
Præcipe for record on appeal	155	82
Petition, stipulation, and order extending time for filing record	157	83
Statement of evidence	161	85
Testimony of W. J. Parks	161	85
Terrence Hughes	192	102
Patrick H. Meagher	197	104
Charles S. Warren	203	108
M. H. McNulty	213	113
John O'Donnell	217	115
Joseph C. Pyle	226	119
Dave Kirby	241	127
W. A. Clark	246	130
J. P. Murray	255	135
Fred T. Greene	265	140
John D. Irving	437	225
Walter Harvey Weed	545	277
Fred Searls, Jr.	649	328
Fred T. Greene (recalled)	739	373
John D. Irving (recalled)	748	377
Fred Searls, Jr. (recalled)	761	383
Horace V. Winchell	767	387
Offers of evidence and colloquy between court and counsel	843	423
Motion to strike out evidence	860	432
Order on motion to strike out evidence	860	432
Defendant's offers of evidence and colloquy	862	432
Testimony of W. A. Clark (recalled)	865	434
I. Freimuth	869	436
John H. Simpson	873	438

	Original.	Print
Testimony of Arthur B. Clark	879	441
John W. Finch	891	447
R. C. Davis	1080	539
William L. Creden	1093	545
William H. Emmons	1097	547
Rollin D. Salisbury	1213	604
Albert Burch	1294	642
Walter H. Wiley	1420	703
Albert Burch (recalled)	1535	757
John W. Finch (recalled)	1540	759
John D. Irving (recalled)	1557	768
Walter H. Wiley (recalled)	1560	769
Henry D. Morse	1561	770
Defendant's Exhibit 120—Agreement between Clark-Montana Realty Co. and Peake, October 29, 1906	1574	776
Defendant's Exhibit 121—Letter, Bruce to Mangam, June 14, 1915	1577	778
Testimony of George M. Bennett	1580	780
Testimony of A. B. Clark (recalled)	1589	785
Defendant rests	1595	788
Testimony of Walter M. Bickford	1596	788
John D. Irving (recalled)	1600	790
Fred Searls, Jr. (recalled)	1640	809
Fred T. Greene (recalled)	1700	839
Walter Harvey Weed (recalled)	1735	856
Frank A. Lindforth	1736	857
Horace V. Winchell (recalled)	1739	859
Walter Harvey Weed (recalled)	1757	868
Plaintiff rests	1759	869
Testimony of Albert Burch (recalled)	1760	869
John W. Finch (recalled)	1771	875
Walter H. Wiley (recalled)	1789	883
Henry P. Morse (recalled)	1794	886
Testimony closed	1798	888
Colloquy between court and counsel	1799	888
Stipulation as to exhibits, &c	1801	889
Judge's certificate to statement of evidence	1802	890
Clerk's certificate	1804	890
Order that portion of opinion of Bourquin, J., be printed as a part of record on appeal	1806	891
Stipulation that portion of opinion of Bourquin, J., be printed as a part of record on appeal	1807	892
Portion of opinion, Bourquin, J.	1808	892
Service of transcript of record	1818½	897
Order of submission	1820	898
Order filing opinion and recording decree	1821	899
Opinion, Gilbert, J.	1822	899
Decree	1839	908
Petition for rehearing	1840	908
Order denying petition for rehearing	1860	917

	Original.	Print
Orders staying mandate	1861	918
Petition for appeal	1865	921
Assignment of errors	1867	922
Order allowing appeal	1880	930
Bond on appeal	1881	931
Citation and service (copy)	1883	932
Stipulation as to record	1884	933
Præcipe for record	1885	934
Clerk's certificate	1887	935
Citation and service	1888	936

a

TRANSCRIPT OF RECORD.

(In Three Volumes.)

United States Circuit Court of Appeals for the Ninth Circuit.

No. —.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees,

vs.

BUTTE & SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Appellant,

Volume 1.

(Pages 1 to 592, Inclusive.)

Upon Appeal from the United States District Court for the District of Montana.

1 *Names and Addresses of Soliciters of Record.*

John P. Gray, Cœur d'Alene, Idaho; M. A. Folsom, Spokane, Wash.; J. L. Templeman and Geo. F. Shelton, Butte, Montana, Solicitors for Complainant-.

Kremer, Sanders & Kremer, Butte, Montana; W. H. Dickson and A. C. Ellis, Jr., Salt Lake, Utah, Solicitors for Defendant.

In the District Court of the United States for the District of Montana.

In Equity.

No. 19.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE & SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Final Record.

Be it remembered, that on the 22nd day of July, 1914, a bill of complaint was filed herein, which is entered of final record as follows, to-wit:

2 In the United States District Court for the District of Montana.

In Equity.

No. —.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE & SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Bill of Complaint.

Elm Orlu Mining Company, a corporation organized under the laws of the State of Washington, and Clark-Montana Realty Company, a corporation organized under the laws of the State of Washington, as plaintiffs, bring this Bill of Complaint against the Butte and Superior Copper Company, Limited, a corporation, organized under the laws of the State of Arizona, defendant, and for a cause of action allege:

I.

That plaintiff, Elm Orlu Mining Company, ever since the year 1906 has been, and now is, a corporation organized and existing under and by virtue of the laws of the State of Washington, and is now, and during all the time since the year 1906 has been a citizen and resident of the State of Washington.

3 That plaintiff, Clark-Montana Realty Company, is now and since 1904 has been, a corporation organized and existing under and by virtue of the laws of Washington, and is now, and ever since 1904 has been a citizen and resident of the State of Washington.

That said corporations have complied with the laws of the State of Montana authorizing corporations to do business in said state, and are now, and for several years last past have been doing business within said State of Montana.

II.

That the defendant, Butte and Superior Copper Company, Limited, is now, and for many years last past has been, a corporation organized and existing under and by virtue of the laws of the State of Arizona, and is now, and for many years has been, a citizen and resident of the said State.

That said corporation has complied with the laws of the State of Montana authorizing corporations to do business in said State, and

has been, and now is, carrying on business within said State of Montana.

III.

That the jurisdiction of the United States District Court for the District of Montana over this suit is invoked and depends upon two grounds, to-wit:

1. Upon the ground that the construction and application of Sections 2322, 2324, 2325 and 2332, of the Revised Statutes *if* the United States is involved, and the amount in controversy
4 exceeds in value the sum of Three Thousand ($3,000.00) Dollars, exclusive of interest and costs, all of which will appear from the facts hereinafter set forth.

2. Upon the ground that plaintiffs are citizens and residents of the State of Washington, and that defendant is a citizen and resident of the *t*State of Arizona, as appears from the first and second paragraphs of this Bill of Complaint; that the suit involves a claim of title to real property in the District of Montana, and the amount in controversy in this suit exceeds in value, exclusive of interest and costs, the sum of Three Thousand ($3,000.00) Dollars.

IV.

That on or about the 18th day of April, 1875, certain predecessors in interest of the plaintiff, Clark-Montana Realty Company, to-wit: M. McNamee, Charles E. Savage, and I. C. Burkett, all then citizens of the United States, discovered a vein or lode containing silver, lead, copper, zinc, and other valuable minerals and metals, upon vacant and unoccupied public land within what was then Deer Lodge County, but afterwards became a part of Silver Bow County, Montana, and within the limits of the claim hereinafter described as the Elm Orlu Mining Claim.

V.

That the said named persons on said date located a claim upon such vein or lode and named it the "Elm Orlu Mining Claim." They posted a notice upon said claim at the point of dis-
5 covery, which notice contained the name of the claim, the names of the locators, the date of the location, the number of lineal feet claimed in length along the course of the vein each way from the point of discovery and the width claimed on each side of the center of the vein.

VI.

That the said locators immediately thereafter sunk a discovery shaft upon the lode and disclosed a vein of quartz and ore with one well defined wall.

VII.

That said locators also immediately after posting said notice heretofore referred to, distinctly marked the location on the ground so that its boundaries could be readily traced, and within twenty (20) days after making the discovery aforesaid, they filed in the office of the County Recorder of the county in which the claim was situated a declaratory statement in writing, a copy of which is hereto attached and marked Exhibit "A."

VIII.

That thereafter the said locators and their successors in interest, held, worked, possessed and actually occupied the said Elm Orlu Lode mining claim continuously from the date of said discovery for more than five (5) years thereafter, and during all of said time were in the open, notorious, exclusive and uninterrupted possession of said claim.

6

IX.

The said Elm Orlu Lode Mining Claim is known as survey No. 1202, Lot No. 159 and is described as follows, to-wit:

Beginning at Corner No. 1 from which the southwest corner of Section 6 in Township 3, North of Range 7 West of the principal meridian, bears north 87 deg. 05 min., W. 1611 feet; thence from said Corner No. 1 N. 85 deg. 38 min. East 1500 feet to Corner No. 2; thence North 15 deg. West 400 feet to corner No. 3; thence north 89 deg. 55 min. West 1527 feet to corner No. 4; thence south 15 deg. east 521 feet to the place of beginning; excepting all that portion of the surface ground above described embraced in Lot 53 (Black Rock Lode), Lot 75 (Jersey Blue Lode) and Lot 121 (Boston Lode). Said claim is situated in the county of Silver Bow, Montana.

X.

That about June 1st, 1880, the owners of the Elm Orlu lode mining claim abandoned the following portion of the surface of said claim, to-wit:

Beginning at a point on the north boundary of the said Elm Orlu Lode Claim, said point being the intersection of the west end line of the Black Rock Lode Claim, Sur. No. 596, Lot No. 53, with the north boundary of the Elm Orlu Lode Claim; running thence S.

7 89 deg. 55 min. East 804 feet to the northeast corner of the Elm Orlu Claim; thence south 15 deg. east 214 feet along the east end line of said Elm Orlu Claim to a point on the south side line of said Black Rock Lode Claim; thence North 79 deg. 15 min. West along said south side line 875 feet to the southwest corner of said Black Rock Lode claim; thence north 2 deg. west along the west end line of said Black Rock Lode Claim 46 feet more or less to the point of beginning.

XI.

That during the year 1882 the then owners of the Elm Orlu Mining Claim filed in the United States Land Office at Helena, Montana, their application for patent for the Elm Orlu Lode Mining Claim, as above described, excepting that portion which they had heretofore abandoned; and in their said application for patent recited the facts with reference to the discovery and location of their claim as heretofore set forth, and filed in said Land Office a copy of the declaratory statement heretofore referred to.

XII.

That the officers of the United States Land Office accepted said proof of discovery and location and said declaratory statement, and on December 30th, 1882, payment for said land was made by the claimant to the United States, and entry of said claim was allowed upon the proof aforesaid, and a receiver's final receipt was issued,
and subsequently, to-wit: On the 31st day of January, 1884,
8 the Commissioner of the General Land Office approved the
acts of said officers of the United States Land Office, and issued United States patent to said owners of said Elm Orlu Lode Mining Claim.

XIII.

That subsequently, to-wit: On the 10th day of June, 1904, by mesne conveyances from the said original locators of the said Elm Orlu Lode Mining Claim, the Clark-Montana Realty Company, one of the plaintiffs herein, became the owner of said Elm Orlu Lode Mining Claim; that on August 18th, 1906, said Clark-Montana Realty Company conveyed to W. A. Clark, Jr., an undivided one-half interest in said Elm Orlu claim, and on December 8th, 1913, W. A. Clark, Jr., reconveyed to the said Clark-Montana Realty Company said undivided one-half interest; that said Clark-Montana Realty Company ever since has been, and now is, the owner in possession and entitled to the possession of said Elm Orlu Lode Mining Claim, and all veins, lodes or ledges having their top or apices therein, throughout their entire depth between the end lines of said claim extended northerly in their own direction.

XIV.

That heretofore, to-wit, on or about the 31st day of December, 1906, said Clark-Montana Realty Company executed and delivered to Elm Orlu Mining Company a lease of said Elm Orlu Claim and the whole thereof for a period of five years upon a royalty basis, and
on December 31st, 1913, said lease was extended for an ad-
9 ditional term of five years, and said Elm Orlu Mining Company has since said December 31st, 1906, occupied and possessed said claim under and by virtue of said lease.

XV.

That the defendant, Butte and Superior Copper Company, Limited, is the owner of the Black Rock, Jersey Blue, Admiral Dewey and Silver Lode Mining Claims, which adjoin the said Elm Orlu Mining Claim on its north side; that the relative situation of the said Black Rock, Jersey Blue, Admiral Dewey, Silver and Elm Orlu Lode Mining Claims is correctly shown upon the map attached hereto and marked Exhibit "C."

The Black Rock Claim is described as follows, to-wit:

Beginning at Corner No. 1 of said Black Rock Lode designated as Lot No. 53, embracing a portion of Section 6, twp. 3 N. R. 7 West of the Principal Meridian Summit Valley Mining District, Silver Bow County, Montana; thence south 2 deg. east 392 feet, to corner No. 2 from which cor. No. 2 Lot 38 patented to A. J. Davis bears south 9 deg. 30 min. west at the distance of 27 chains and 90 links; thence from said corner No. 2 North 79 deg. 15 min. west 1500 feet to corner No. 3; thence N. 2 deg. West 449 ft. to cor. No. 4; thence south 77 deg. 15 min. east 1500 feet to corner No. 1, the place of beginning.

10 XVI.

That sometime subsequent to November 1st, 1875, and prior to November 24th, 1880, the predecessors in interest of the defendant located the Black Rock claim, and filed in the office of the County Recorder of the County in which said claim was located a declaratory statement in writing, a copy of which is attached hereto, and marked Exhibit "B."

XVII.

That thereafter, and prior to November 24th, 1880, the said locators of the said Black Rock Lode Mining Claim filed in the United States Land Office at Helena, Montana, an application for patent for said Black Rock Lode Mining Claim, based on the declaratory statement aforesaid, and on November 24th, 1880, said locators paid for said claim and mineral entry was allowed and receiver's final receipt issued for said claim. Subsequently, to-wit, on February 15th, 1882, the United States issued its patent for said claim to the owners thereof.

XVIII.

That within said Elm Orlu Lode Mining Claim there is a vein or lode of rock in place bearing copper, zinc, silver, gold and other valuable minerals, which said vein or lode is commonly known as the Rainbow Lode. The top or apex of said Rainbow Lode crosses the west end line of said Elm Orlu Lode Mining Claim, which line connects corners numbered 1 and 4 of said claim, and thence proceeds in

an easterly direction through said claim, and the said vein on its course continues easterly through said claim, and one fork of the apex of said vein crosses the east end line of said m Orlu Claim (being the line which connects corners No. 2 and at a point south of the south side line of the Black Rock Claim, d the other fork crosses the south boundary line of the Black Rock aim at a point about 350 feet east of the southwest corner of said ack Rock Claim and continues until it crosses the north boundary ne of said Black Rock Claim.

XIX.

That said Rainbow Lode was the vein or lode upon which the discovery of the Elm Orlu Lode Mining Claim was made.

XX.

That the downward course of said vein is northerly. On its said ownward course between planes drawn downward vertically through he end lines of said Elm Orlu Claim extended northerly in their wn direction, said vein passes under and extends indefinitely northrly beyond a vertical plane drawn downward through the south oundary line of the Black Rock Lode Claim, the south boundary ines of the Admiral Dewey, Silver and the Jersey Blue Claims. Said vein on its downward course passes underneath the surface of he said Black Rock Lode Mining Claim, the Admiral Dewey, Silver nd Jersey Blue Lode Mining Claims.

XXI.

Plaintiffs aver that since June 10th, 1907, said Clark-Mon-
12 tana Realty Company has been the owner of an interest in and to said Elm Orlu Claim as follows: Between August 18th, 1906, and December 8th, 1913, said Company was the owner of an undivided half interest in and to said claim (W. A. Clark, Jr., being the owner of the remaining half interest), and since the last named date said Company has been, and now is, the sole owner in fee, in possession and entitled to the possession of said Elm Orlu Mining Claim, and of said Rainbow vein throughout its entire depth, (subject only to the rights of its tenant Elm Orlu Mining Company as aforesaid), between planes drawn downward vertically through the end lines of the Elm Orlu Lode Mining Claim, and said end lines extended northerly in their own direction.

XXII.

Plaintiffs further aver that defendant claims an estate or interest adverse to plaintiffs in and to said Elm Orlu Lode Mining Claim, and in or to the vein or lode heretofore referred to as the Rainbow Lode, and in and to that part of the said Rainbow Lode which lies between vertical planes drawn downward through the end lines of said

Elm Orlu Lode Claim and said end lines extended northerly in their own direction, the exact nature of which claims are unknown to plaintiffs.

XXIII.

Plaintiffs aver that said claims, and each of them, are false and groundless, and are a cloud on said plaintiffs' title; that said claims are without any right whatever, and that said defendant has
13 no right, title or interest whatever in or to said Elm Orlu Lode Mining Claim, or in or to said Rainbow Lode, or any part thereof, between said planes hereinbefore described.

XXIV.

Plaintiffs further aver that said Elm Orlu Lode Mining Claim, as hereinbefore described, is of great value, to-wit: More than One Hundred Thousand ($100,000.00) Dollars, and that the value of said part of said Rainbow Lode hereinbefore described, lying between the end line planes of the Elm Orlu Claim hereinbefore referred to, exceeds in value the sum of One Hundred Thousand ($100,000.00) Dollars, and that portion of said lode to which said defendant wrongfully asserts title and claim as hereinbefore alleged, exceeds in value the sum of One Hundred Thousand ($100,000.00) Dollars, exclusive of interest and costs. That plaintiff Elm Orlu Mining Company's interest in said claim and lode exceeds in value the sum of Three Thousand ($3,000.00) Dollars, exclusive of interest and costs.

XXV.

Plaintiffs further aver that sometime subsequent to the 1st day of March, 1910, and while the Clark-Montana Realty Company and W. A. Clark, Jr., were the owners thereof, and also since December 8th, 1913, while said Realty Company was the sole owner of said claim and vein, said defendants, Butte and Superior Copper Company, Limited, did, by means of secret underground works in its exclusive possession and control, wilfully and knowingly pene-
14 trate into and upon those parts of said Rainbow Lode which lie between the planes hereinbefore described, and beneath the surface of the Elm Orlu and Black Rock claims; that said underground works of said defendant cut and intersected said vein, which contains large and valuable ore bodies of silver, zinc, and other valuable minerals, and said defendant wilfully and knowingly extracted and removed therefrom large amounts of said ore and minerals and appropriated to its own use and sold the same; that the exact amount of ore so removed is unknown to plaintiffs, but plaintiffs allege that said amount exceeds in value the sum of Fifty Thousand ($50,000.00) Dollars; that plaintiffs have no means of ascertaining the amount and value of said ores excepting by a discovery and accounting.

XXVI.

That said defendant threatens to and will, unless restrained by an order of this court, extend its present workings upon said vein, and extract and remove from said lode, the property of plaintiff, Clark-Montana Realty Company, and convert to its own use the entire value thereof to the irreparable damage of plaintiffs herein.

XXVII.

That on or about the 15th day of December, 1913, said W. A. Clark, Jr., for a valuable consideration, assigned to said Clark-Montana Realty Company all causes of action which he had against said defendant on account of the matters and things herein contained.

15 Wherefore, plaintiffs pray:

1. That defendant be required to answer this complaint, but not under oath, plaintiffs expressly waiving the oath of defendant to the answer.

2. That defendant be required to set forth the nature of its claim in and to said portion of the vein hereinbefore described, and in and to the said Elm Orlu Claim; and that all adverse claims of defendant may be determined by a decree of this court; that by said decree it be declared and adjudged that said defendant has no estate or interest whatsoever in or to said Elm Orlu Lode Claim, or in or to any portion of said Rainbow Lode or vein as hereinbefore described; that by said decree it be declared and adjudged that the title of plaintiffs thereto is good and valid and the said defendant be enjoined and restrained from asserting any claims whatsoever in or to said Elm Orlu Lode Mining Claim, or in or to said Rainbow Lode between the planes hereinbefore described adverse to plaintiffs.

3. That said defendant, its agents, servants and employees, be restrained from further penetrating in or upon said Rainbow Lode between said planes during the pendency of this action, and from extracting or removing from said vein any ore, earth or rock.

4. That by said final decree said defendant, its servants, agents and employees, be perpetually enjoined from entering upon the said Elm Orlu Lode Mining Claim, or the said Rainbow Lode between the planes hereinbefore described, or from working or mining thereon, or making or continuing any cut, opening or excavation on
16 or in said vein or lode or mining ground, or any part thereof, and from removing from said mining ground or any part thereof, any rock, ore or mineral substance whatever.

5. That defendant be required to account for all ores heretofore extracted from the said premises hereinbefore described, and that plaintiffs have judgment and decree for the value of said ore so wrongfully extracted and removed.

6. Plaintiffs pray for such other and further relief as shall be meet and agreeable to equity, and for costs of suit.

JOHN P. GRAY,
Cœur d'Alene City, Idaho;
J. L. TEMPLEMAN,
Butte, Montana;
MYRON A. FOLSOM,
Paulsen Bldg., Spokane, Wash.,
Solicitors and Counsel for Plaintiffs.

UNITED STATES OF AMERICA,
District of Montana, ss:

W. D. Mangam, being first duly sworn on oath, deposes and says: That he is an officer, to-wit, the secretary of the Elm Orlu Mining Company, one of the plaintiffs herein; that he has read the foregoing complaint and knows the contents thereof, and the
17 matters stated therein are true to the best knowledge, information and belief of affiant.

W. D. MANGAM.

Subscribed and sworn to before me the undersigned this 22d day of July, A. D. 1914.

[NOTARIAL SEAL.] FRED J. FURMAN,
Notary Public for the State of Montana,
Residing at Butte, Montana.

My commission expires Sept. 28, 1916.

Exhibit A to the Complaint.

Elm Orlu.

Summit Valley Mining District.

Deer Lodge County, M. T.

Notice is hereby given that M. McNamee, Chas. E. Savage and I. C. Burkett, have this 18th day of April, A. D. 1875, located the Elm Orlu Lode bearing gold, silver and other metals under the provisions of the act of Congress of May 10, 1872, situated in the mining district aforesaid and described as follows to-wit: Beginning at the East line of the Poe Lode, thence running along the lode easterly fifteen hundred feet together with three hundred feet of surface ground on each side of the center of the vein and
18 marked at each corner by stone mounds. The Discovery post is three hundred feet easterly from the beginning. The claimants adjoining are F. W. Barnard & Co. on the west and Anson Ford on the East.

C. E. SAVAGE.

TERRITORY OF MONTANA,
County of Deer Lodge, ss:

On the 19th day of April, A. D. 1875, personally appeared before me the undersigned a Justice of the Peace in and for said County, Charles E. Savage, and made oath that he and M. McNamee and I. C. Burkett are of lawful age, citizens of the United States, and that the above notice is substantially a copy of the original notice of location of the claim above described, as posted thereon.

ANSON FORD, *J. P.*

Filed for Record April 22d, A. D. 1875 at 8 1/4 o'clock P. M. H. S. Clark, County Recorder.

19 *Exhibit B to the Complaint.*

Black Rock Lode Claim.

Summit Valley Mining District.

Deer Lodge, Territory of Montana.

Notice is hereby given that the undersigned have this 6th day of November, 1875, located (1500) feet in length and (600) feet in width on the above named quartz mining claim, bearing silver and other metals situated in the Mining District, County and Territory aforesaid; together with all mineral veins contained within the following described metes and bounds, to-wit: Beginning at Discovery Stake situated on the east slope of a ridge about one fourth of a mile south from the Climax Lode, and about one-half mile west from Silver Bow Creek running easterly 750 feet, and westerly 750 feet, from said Discovery, comprising 750 feet in an easterly direction and 750 feet in a westerly direction from the center of Discovery Shaft, including 300 feet in width on each side of the center of said lode. The corners of said claim being marked by posts firmly set in the ground so that its boundaries can be readily traced.

A substantial copy of this notice was posted at the Discovery Shaft on said claim on the 6th day of November, 1875. The adjoining claimants are unknown.

WILLIAM A. CLARK.
JOSEPH K. CLARK.
HENRY S. CLARK.
JOHN C. BELK.

20 MONTANA TERRITORY,
Deer Lodge County, ss:

On this 13th day of November, A. D. 1875, before me the undersigned, personally appeared Joseph K. Clark, and Henry S. Clark,

who being first duly sworn on oath says that the above named locators of Black Rock Lode are citizens of the United States and that the foregoing notice by them subscribed is substantially a true copy of the original notice of location of the claim above described as posted thereon on the day therein stated.

JOSEPH K. CLARK.
HENRY S. CLARK.

Subscribed and sworn to before me the day and year last above written.

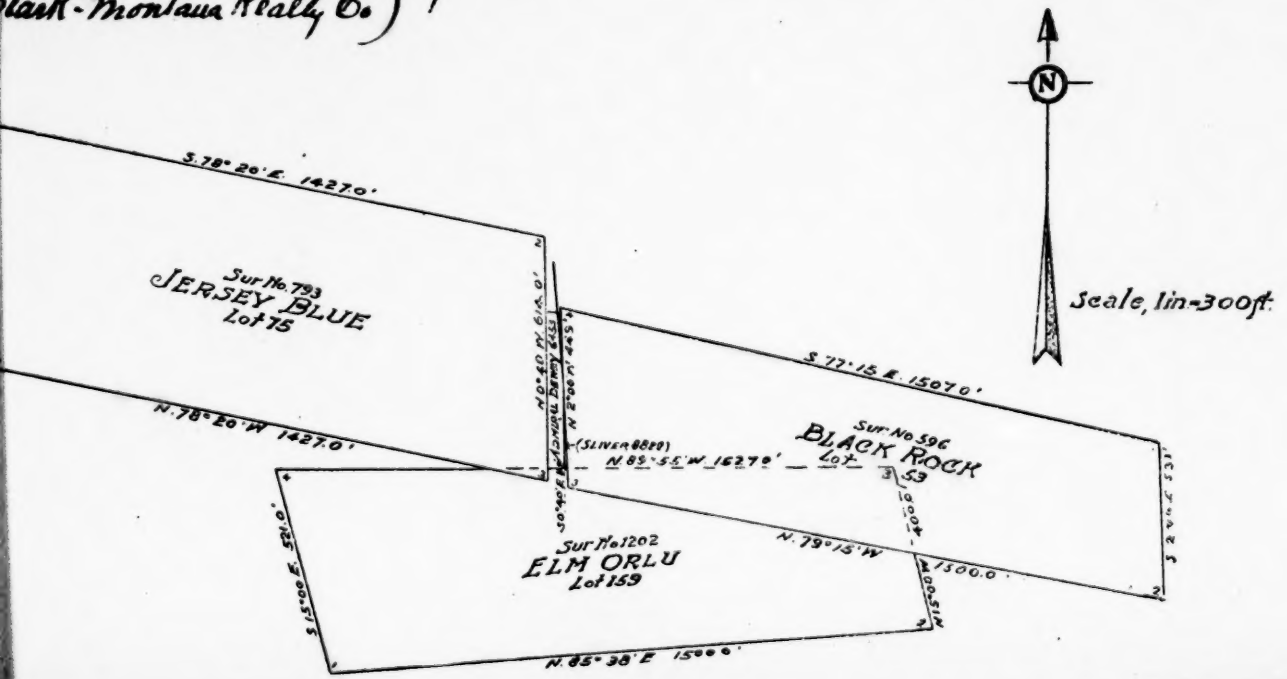
[NOTARIAL SEAL.] J. L. COUGHENOUR,
Notary Public.

Filed for record November 13th, A. D. 1875, at 10 o'clock A. M. H. S. Clark, County Recorder.

(Here follows diagram marked p. 21.)

598

utte & Superior M. Co
v.
lack-Montana Realty Co. } $21.



22 Filed July 22, 1914. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy Clerk.

And thereafter, on the 23rd day of July, 1914, Subpœna in Equity was filed herein, which is entered of final record as follows, to-wit:

UNITED STATES OF AMERICA:

District Court of the United States, District of Montana.

In Equity.

The President of the United States of America, Greeting:

To Butte and Superior Copper Company, Limited, a Corporation, Defendant:

You are hereby commanded, that you be and appear in said District Court of the United States aforesaid, at the Court Room in Federal Building, Butte, Montana, on the 11th day of August, 1914, to answer a Bill of Complaint exhibited against you in said Court by Clark-Montana Realty Company, a Corporation, and Elm Orlu Mining Company, a Corporation, Complainant, who is a citizen of the United States and to do and receive what the said Court shall have considered in that behalf. And this you are not to omit, under the penalty of five thousand dollars.

23 Witness, the Honorable Geo. M. Bourquin, Judge of the District Court of the United States for the District of Montana, this 22nd day of July, in the year of our Lord one thousand nine hundred and fourteen and of our Independence the 138.

[COURT SEAL.]

GEO. W. SPROULE, *Clerk,*
By HARRY W. WALKER,
Deputy Clerk.

Memorandum Pursuant to Rule 12, *Supreme Court U. S.*

You are hereby required, to file your answer or other defense in the Clerk's office of said court on or before the twentieth day after service, excluding the day thereof; otherwise the bill may be taken pro confesso.

GEO. W. SPROULE, *Clerk,*
By HARRY W. WALKER,
Deputy Clerk.

JOHN P. GRAY AND
J. L. TEMPLEMAN,
Solicitors for Complainant, Butte, Montana.

UNITED STATES MARSHAL'S OFFICE,
District of Montana:

I hereby certify that I received the within writ on the 22nd day of July, 1914, and personally served the same on the 22nd
24 day of July, 1914, by delivering to, and leaving with J. Bruce Kremer, statutory agent for service of defendant company, a true copy of said subpœna in equity, together with a true copy of the bill of complaint in said action, personally at Butte in the County of Silverbow in said district.

[COURT SEAL.] WILLIAM LINDSAY,
U. S. Marshal,
By GEORGE A. McKAY,
Deputy.

Butte, July 22, 1914.

Filed July 23, 1914. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy Clerk.

And thereafter, on the 26th day of September, 1914, answer was filed herein, which is entered of final record as follows, to-wit:

In the United States District Court for the District of Montana.

25 In Equity.

No. —.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Answer.

Comes now the defendant above-named, Butte and Superior Copper Company, Limited, and makes answer to the bill of complaint of the above-named plaintiffs, and for answer thereto:

I.

Admits each and all of the allegations contained in paragraphs one, two, fourteen, fifteen, sixteen, and twenty-seven of said bill.

II.

Answering the third paragraph of said bill, this defendant denies that the United States District Court, for the District of Montana, has

jurisdiction over this suit upon the first ground stated in said paragraph.

Furthermore answering said third paragraph, this defendant admits that said court has jurisdiction over the subject matter of said suit, and this defendant hereby waives any objection which it might interpose to the jurisdiction of said court over it, said defendant.

III.

Answering the fourth paragraph of said bill, this defendant denies that on or about the 18th day of April, 1875, or at any other time, M. McNamee, Charles E. Savage and I. C. Burkett, or either of them, discovered a vein or lode containing silver, lead, copper, zinc,
26 or any other metal or mineral, upon vacant, or unoccupied, public land within the limits of the claim, described in said bill as the Elm Orlu Mining Claim.

IV.

Answering the fifth paragraph of said complaint, this defendant denies that on or about the 18th day of April, 1875, or at any other time, the said McNamee, Savage and Burkett, or either of them located a claim upon any vein or lode within the limits of the said alleged Elm Orlu Mining Claim. That whether or not said named persons, or either of them, ever, at any time, posted a notice upon said alleged Elm Orlu Mining Claim, as alleged in said fifth paragraph, of said bill, this defendant has no knowledge, information or belief, and for want of such knowledge, information and belief, this defendant denies that any such notice was ever posted upon said alleged claim; and denies that said persons, or either of them, ever, at any time, posted any notice whatever on said alleged claim, at the point of discovery of any vein or lode within the limits of said alleged claim. And on the contrary, this defendant alleges, as it has heretofore alleged, that said persons did not, nor did either of them, ever, at any time, discover any vein or lode whatever within the limits of said alleged claim.

V.

Answering the sixth paragraph of said bill, this defendant denies that said named persons, or either of them, ever, at any time, sunk a discovery shaft upon any lode or vein within the limits of
27 said alleged Elm Orlu Mining Claim, which shaft disclosed a vein of quartz or ore, or any wall, of any vein or lode whatever.

VI.

Answering the seventh paragraph of said bill, this defendant alleges that it has no knowledge, information or belief as to whether or not said named persons, or either of them, ever distinctly marked

said alleged Elm Orlu Mining Claim on the ground, so that its boundaries could be readily traced, and for lack of such knowledge, information and belief, this defendant denies that they, or either of them, ever, at any time, marked distinctly, or otherwise, or at all, said alleged Elm Orlu Mining Claim on the ground.

Further answering said seventh paragraph, this defendant admits that said named persons, within five (5) days after the 18th day of April, 1875, to-wit: on the 22nd day of April, 1875, filed, or caused to be filed, in the office of the County Recorder of the county in which said alleged Elm Orlu Mining Claim was situated, an alleged declaratory statement in writing, and that the paper marked Exhibit "A," and attached to plaintiff's said bill of complaint is a true copy thereof. But this defendant denies that said named persons, or either of them, prior to the filing thereof, or at any other time, discovered any vein or lode whatever within the limits of said alleged Elm Orlu Mining Claim.

And this defendant further alleges and shows to the court that said alleged and pretended declaratory statement, so filed with the
28 County Recorder of said county, as aforesaid, is fatally defective, in that it appears upon the face thereof that it fails to comply with the requirements of the Statute of Montana in such case made and provided (namely the first section of an Act of the Legislative Assembly of the Territory of Montana, approved May 8th, 1873, and entitled "An Act Providing for the Location and Recording of Mining Claims on Veins or Lodes",) which said Act remained unrepealed and unmodified until long after the final entry of said Elm Orlu Mining Claim, in the patent proceedings hereinbefore in this answer mentioned, to-wit: the 30th day of December, 1882; and this defendant further alleges that neither of the alleged locators of said mining claim, or any of the successors in interest of them, or either of them, filed, or caused to be filed, in the office of the County Recorder of the county in which said alleged claim was situated, any other declaratory statement than that mentioned in said bill, of which Exhibit "A", thereto attached, is, as aforesaid, a true copy, and that by reason of the failure of said alleged locators, or either of them, their, or either of their successors in interest, to file in the office of the recorder of said county, any declaratory statement, such as is required by the provisions of said Section 1 of said Act, the alleged and attempted location of the said Elm Orlu Mining Claim was null and void, and neither of the said alleged locators, or any of the successors in interest of them, or either of them, ever acquired any
29 estate, right, title or interest whatsoever in or to any part or portion of said alleged Elm Orlu Mining Claim, by virtue of such attempted location; but that this defendant admits and concedes, by the issuance of the patent mentioned in the twelfth paragraph of said bill, it was conclusively determined, that at the time of the final entry of said claim, to-wit: on the 30th day of December, 1882, the said Elm Orlu was a valid and subsisting mining claim.

VII.

Answering the eighth paragraph of said bill, this defendant denies that the locators therein referred to, or any of them, or any of the successors in interest of them, or either of them, held, worked, possessed, or actually occupied, the said alleged Elm Orlu Mining Claim, or any part thereof, continuously from the date of the alleged discovery, for more than five years thereafter, or for any other period of time; and denies that they, or either of them, their, or either of their successors in interest, were ever in the open, notorious, exclusive, or uninterrupted possession of said alleged Elm Orlu Mining Claim.

Further answering said eighth paragraph of said bill, this defendant alleges that in the proceedings instituted by the claimed locators of the Elm Orlu lode claim, and predecessors in interest of the plaintiffs, in the United States Land Office, for patent to said claim, and in all proceedings taken before the General Land Office, the right to patent therefor was based upon the alleged notice of location and alleged declaratory statement made, posted and filed by such
30 claimed locators and predecessors in interest of the plaintiffs, and at no time, in said proceedings, did the said claimed locators, or predecessors in interest of plaintiffs, assert, claim the benefit of, or rely upon, the provisions of Section 2332 of the Revised Statutes of the United States, or of any claim of adverse possession of the said lode claim; that such failure on the part of the claimed locators and predecessors in interest of the plaintiffs, during said patent proceedings, to assert, or rely upon, adverse possession of said lode claim, under the provisions of Section 2332 of the Revised Statutes of the United States, does now, and ought to, estop and preclude the plaintiffs, and each of them, from asserting any estate, right, title or interest in or to the said Elm Orlu Mining Claim, founded upon a claim of adverse possession thereof by said plaintiffs, or their predecessors in interest.

VIII.

Answering the ninth paragraph of said bill, this defendant denies that the description therein found is a correct description of the said alleged Elm Orlu lode mining claim.

IX.

Answering the tenth paragraph of said bill, this defendant denies that about June 1st, 1880, or at any other time, any person or persons claiming to be the owner, or owners, of the alleged Elm Orlu Lode Mining Claim, ever abandoned that portion of the
31 alleged Elm Orlu Lode Mining Claim described in said tenth paragraph, or any part thereof.

Further answering said tenth paragraph, this defendant alleges that neither of said plaintiffs, or any of the predecessors in interest

of them, or either of them, ever had any estate, right, title or interest whatever, in or to any part or portion of the premises described in said tenth paragraph; and denies that they, or either of them, or their, or either of their predecessors in interest, ever had possession of the same, or any part thereof.

X.

Answering the eleventh paragraph of said bill, this defendant admits that during the year 1882, the then alleged owners of the alleged Elm Orlu Mining Claim, filed in the United States Land Office, at Helena, Montana, their application for a patent for said alleged Elm Orlu Lode Mining Claim; but denies that before, or at the time of the filing of said application, the said applicants were, or that either of them was, the owners or owner of said alleged Elm Orlu Mining Claim, or that they, or either of them, had any estate, right, title or interest whatever therein. And denies that prior to the time of said application, any of the predecessors, through or under whom said applicants claimed, had ever had any estate, right, title or interest to said alleged Elm Orlu Mining Claim, and denies that said application for patent recited the facts, or any of the facts, with ref-
32 erence to the discovery or location of their said claim, namely, the alleged Elm Orlu Mining Claim.

Further answering said eleventh paragraph this defendant admits that the said applicants for said patent filed in said Land Office, a copy of the alleged declaratory statement, heretofore in this answer referred to, and of which Exhibit "A," annexed to said bill, is a copy.

XI.

Answering the twelfth paragraph of said bill, this defendant alleges that it has no knowledge or information as to whether or not the officers of said last named office, accepted said alleged declaratory statement and said alleged proof of discovery, and for lack of such knowledge and information this defendant denies that the same was so accepted.

Further answering said paragraph, this defendant admits that on December 30th, 1882, payment for said land was made by said plaintiffs to the United States, but as to whether entry of said claim was allowed upon said proof, defendant alleges that it has no knowledge or information, and for lack of such knowledge or information denies the same.

Admits that a receiver's receipt was issued, but as to whether, on the 31st day of January, 1884, or at any other time, the Commissioner of the United States Land Office approved the acts of said officer of said United States Land Office, this defendant alleges that it has no knowledge or information, and for lack of such knowledge and information denies such approval, but admits that said
33 Commissioner issued, or caused to be issued, a United States patent to the claimed owners of said Elm Orlu Mining Claim.

XII.

Answering the thirteenth paragraph of said bill, this defendant admits each and all of the allegations therein contained, except the allegation therein that the plaintiff, Clark-Montana Realty Company, is, and ever since the 8th day of December, 1913, has been, the owner, in possession, and entitled to the possession of all veins, lodes or ledges having their tops or apices within the said Elm Orlu Lode Mining Claim, throughout the entire claim, between the end lines of the claim, extended northerly in their own direction. And in this connection, this defendant alleges that it is informed and believes, and upon such information and belief avers that when final entry was made of the said Elm Orlu Mining Claim, to-wit: on the 30th day of December, 1882, there was no discovered or known vein or lode, within the limits of the said Elm Orlu Mining Claim, other than a vein or lode which crossed the opposite located side lines of said claim, and this defendant, upon information and belief avers that the only attempted location of the said Elm Orlu Mining Claim was based upon a discovery of said vein or lode, which so crossed the opposite side lines of said claim.

XIII.

Answering the allegations contained in paragraph seventeen, defendant admits the same, but alleges that no protest or adverse
34 claim was filed in said United States Land Office against said application on behalf of said Elm Orlu claim by the predecessors in interest of the plaintiffs, or any other person whomsoever.

XIV.

Answering the eighteenth paragraph of said bill, this defendant denies that there is, within the limits of said Elm Orlu Mining Claim, any vein or lode whatever, or rock in place, bearing copper, zinc, silver, gold, or any other metal, or valuable minerals, which crosses at its top or apex, and on its course, the west end line of said Elm Orlu Lode Mining Claim, and thence proceeds in an easterly direction through said claim, which, on its course, continues easterly through said claim, or that one fork of the apex of any vein, found within the limits of said Elm Orlu Lode Mining Claim, crosses the east line of said claim, or that any fork of any vein, found within the limits of said claim, crosses the south boundary line of the Black Rock Claim, at a point about 350 feet east of the southwest corner of said Black Rock Claim, and thence continues until it crosses the north boundary line of said Black Rock Claim. And in this connection this defendant admits that there is a vein or lode of rock in place, bearing gold, silver, copper and other valuable metals or minerals, which, on its course and strike, and at its top or apex, crosses the westerly end line of the said Elm Orlu Lode Mining Claim, and continues thence on its course and at its apex in an

easterly direction for a distance of 305 feet, and that nowhere
35 within the limits of said claim, easterly of said point, has said vein been anywhere disclosed, or is the same known to exist anywhere within said claim, beyond a point 305 feet easterly of the west end line of said claim. And this defendant further alleges that it has no knowledge of, or has there been disclosed, or is there known to exist, the top or apex of any vein or lode whatever within the limits of the said Elm Orlu Mining Claim, easterly of a plane drawn parallel to the west end line of the claim, through a point 710 feet easterly thereof, except a vein, which, on its course and at its top or apex, crosses the southerly side line of the said Elm Orlu Mining Claim, at a point about 710 feet east of the west end line of said claim, and that so far as said last mentioned vein has been developed or disclosed, it is not known to cross any other line of the said claim.

XV.

Answering the nineteenth paragraph of said bill, this defendant denies that the alleged Rainbow vein or lode was the vein or lode upon which the discovery of the Elm Orlu Mining Claim was made, and denies that the alleged Rainbow is found anywhere within the limits of the Elm Orlu Mining Claim.

XVI.

Answering the twentieth paragraph of said bill, this defendant denies that there is found within the limits of the said Elm Orlu Mining Claim any lode or vein, having a course or strike easterly and westerly, the downward course of which is northerly, and
36 that the only known vein within the limits of said claim, having an easterly and westerly course, is the one heretofore in this answer referred to and described as crossing the westerly end line of said claim, the downward course of which is southerly from the surface to a depth of, to-wit: about 900 feet; and denies that the top or apex of any vein or lode is found, or known to exist, within the limits of the said Elm Orlu Claim, which, on its downward course, between planes drawn downward vertically through the end lines of said claim extended northerly in their own direction, passes under, or extends indefinitely, or at all, northerly of a vertical plane drawn downward through the south boundary line of the Black Rock Claim, or the south boundary line of the Admiral Dewey, Silver, or Jersey Blue Claims, or which, on its downward course, passes underneath the surface of the said Black Rock Claim, or the said Admiral Dewey, Silver or Jersey Blue Mining Claims.

XVII.

Answering the twenty-first paragraph of said bill, this defendant specifically denies each and every allegation therein contained.

XVIII.

Answering the twenty-second paragraph of said bill, this defendant denies that it claims an estate or interest adverse to plaintiffs, or either of them, in or to said Elm Orlu Lode Mining Claim. Admits that it claims an estate and interest adverse to plaintiffs, in or to the vein or lode in said bill referred to as the so-called Rainbow
37 Lode. Denies that the said alleged Rainbow Lode lies between vertical planes drawn downward through the end lines of said Elm Orlu Lode Claim, or between said end lines extended northerly in their own direction. Denies that said plaintiffs have, or that either of them ever had, any right, title or interest in or to any vein, lode or ledge which lies between vertical planes drawn downward through the end lines of the said Elm Orlu Lode Claim, beyond planes drawn vertically downward through the boundary lines of said Elm Orlu Claim, except as to said vein hereinbefore in this answer referred to, and described as crossing the opposite located side lines of said claim, and as to the last mentioned vein, the plaintiffs have not, nor has either of them, the right to follow the same extralaterally, except between planes drawn vertically downward through the located side lines of said Elm Orlu Claim.

XIX.

Answering the twenty-third paragraph of said bill, this defendant specifically denies each and every allegations contained therein.

XX.

Answering the twenty-fourth paragraph of said bill, this defendant denies each and every allegation therein contained, except that the plaintiffs' interest in said Elm Orlu Mining Claim and lode exceeds in value the sum of $3,000.00, exclusive of interest and costs.

38 XXI.

Answering the twenty-fifth paragraph of said bill, this defendant denies that subsequent to the 1st day of March, 1910, or at any other time, this defendant did, by means of any underground, or other workings, wilfully, or knowingly, or at all, penetrate into, or upon, any vein or lode, the top or apex, or any part of the top or apex of which is found within the limits of the said Elm Orlu Mining Claim, beneath either the surface of the said Elm Orlu, or the said Black Rock claims. Denies that any underground workings of this defendant cut, or intersect, any vein containing large or valuable ore bodies, the top or apex, or any part of the top or apex, of which, is found within the limits of said Elm Orlu Mining Claim; and denies that this defendant ever wilfully, or knowingly, or at all, extracted or removed large amounts, or any amount, of ore or minerals, of any value whatever, or at all, from any vein or lode, the

top or apex, or any part of the top or apex of which, is found within the limits of said Elm Orlu Claim.

XXII.

Answering the twenty-sixth paragraph of said bill, this defendant denies that it threatens, or ever threatened, to, or that, unless restrained by order of this court, it ever intended to, or would, extend any working upon, or extract or remove any ore or other material whatever, from any lode, the property of said plaintiff, Clark-Montana Realty Company, or upon or from any lode or vein, the top or apex, or any part of the top or apex of which, is found within the limits of said Elm Orlu Mining Claim.

XXIII.

For a further and separate answer and defense to said bill of complaint, this defendant alleges that heretofore, to-wit: on the 29th day of October, 1906, said plaintiff, Clark-Montana Realty Company, then being the owner of an undivided one-fourth of the estate, right, title and interest in the said Black Rock Lode Mining Claim, executed and delivered to the predecessors in interest of this defendant, its certain deed in writing, a copy whereof is hereto attached, marked Exhibit "A," and made a part of this answer, as fully as if the same were herein set forth in hæc verba, and wherein the said plaintiff, Clark-Montana Realty Company, conveyed to said predecessors in interest of this defendant, the said Black Rock Lode Mining Claim, together with all minerals therein contained, and all veins, lodes and ledges therein; and this defendant further alleges that said plaintiffs are, and each of them thereby is, and ought to be, estopped from now asserting, any right, title or interest in or to any ores or minerals found within the said Black Rock mining claim, or in or to any vein, lode, ledge, ore or minerals, sought to be recovered in this action, and from asserting any right, title, or interest in or to any vein, ledge or lode, the top or apex of which is found within the said Black Rock Mining Claim, and which, on its downward course, so far departs from a perpendicular as to pass across or beyond the southerly side line of said Black Rock lode claim.

And this defendant, further answering, and as a basis for affirmative relief in its favor in this suit, alleges and shows to the court:

I.

That at the date of the commencement of this action, and for a long time prior thereto, said defendant was, and had been, and is now, a corporation, duly organized and existing under and by virtue of the laws of the (formerly Territory) now State of Arizona, and at all said times was, and is, a citizen and resident of said state, and

that the plaintiffs were, and each of them was, at all of said times, and now is, a corporation, duly organized under and by virtue of the laws of the State of Washington, and at all of said times have been, and are now, citizens and residents of said last named state; that the said plaintiffs and this defendant have heretofore severally complied with the laws of the State of Montana, authorizing corporations to transact business within the State of Montana.

II.

That this defendant is the owner of, and in possession of, and entitled to the possession of, and it and its predecessors in interest, ever since the 24th day of November, 1880, have been the owners of, in possession and entitled to the possession, of the Black Rock Mining Claim (mentioned in said complaint, and of all veins, lodes
41 or ledges throughout their entire depth, the tops or apices of which are found within the surface boundaries of the said Black Rock Claim, extended downward vertically.

III.

That said Black Rock lode mining claim is known as Survey No. 596, Lot 53, and is described as follows:

Beginning at Corner No. 1 of said Black Rock Lode designated as Lot No. 53, embracing a portion of Section 6, Township 3 N. R. 7 West of the Principal Meridian Summit Valley Mining District, Silver Bow County, Montana; thence south 2 deg. east 392 feet to corner No. 2 from which Cor. No. 2 Lot 38, patented to A. J. Davis bears south 9 deg. 30 min. west at the distance of 27 chains and 90 links; thence from said corner No. 2 north 79 deg. 15 min. west 1,500 feet to corner No. 3; thence north 2 deg. west 449 feet to corner No. 4; thence south 77 deg. 15 min. east 1,500 feet to corner No. 1, the place of beginning.

IV.

That on the 15th day of February, 1882, the Government of the United States, by its Letters Patent, granted and conveyed said Black Rock Mining Claim, together with all veins and lodes, throughout their entire depth, having their tops or apices within the surface boundaries thereof, to William A. Clark, Joseph K. Clark, Charles S. Warren, Henry S. Clark and John C. Belk; that subse-
42 quently, by mesne conveyances from the said patentees of the said Black Rock lode claim, this defendant became, and ever since has been, the owner of said claim.

V.

That there is, within the surface boundaries of said Black Rock Mining Claim, a vein or lode of rock in place, bearing gold, silver, copper, or other valuable metals, which, at its top or apex, and on its

course or strike, crosses the westerly end line of the said Black Rock Mining Claim, and thence, at its top or apex, and on its course or strike, continues in an easterly direction, between the side lines of said claim, for a distance of, to-wit: 818 feet from said west end line, where said vein forks on its course or strike, one branch thereof continuing easterly to and across the easterly end line of said mining claim, and the other fork or branch continuing in a northeasterly direction, to and across the north side line of said claim.

That said vein dips in a southerly direction, and in its course downward so far departs from a perpendicular that at depth it extends, for a portion of its width, to and beyond the southerly side line of said claim, and into and beneath the surface of the said Elm Orlu Mining Claim (mentioned in said bill of complaint).

That this defendant is the owner of, in possession and entitled to the possession of, and it and its predecessors in interest, ever since the 24th day of November, 1880, have been the owners of, in possession and entitled to the possession, of said vein or lode,
43 throughout its entire depth, between planes drawn through the end lines of said claim, continued indefinitely in their own direction southerly.

VI.

That this defendant has never mined or extracted any ore, or mineral-bearing earth or rock, from within the surface boundaries, extended downward vertically, of the said Elm Orlu lode mining claim, except from that portion of said vein or lode, so as aforesaid having its top or apex within the said Black Rock Claim, which, in its downward course, lies, for a portion of its width, within the exterior boundaries, extended downward vertically, of the said Elm Orlu; and this defendant further alleges that the mining and extraction by it of said ore from that portion of said vein, so lying within the exterior boundaries, extended downward vertically, of the said Elm Orlu Mining Claim, and which has its top or apex within the exterior boundaries of the said Black Rock Mining Claim, as aforesaid, and none other, constitutes the pretended wrongs and injuries complained of by plaintiffs in their said bill of complaint.

VII.

This defendant alleges that the said plaintiffs claim some estate or interest adverse to this defendant, in and to said vein or lode, and in and to the ores, metals and minerals therein contained, between vertical planes drawn through the end lines of the said Black Rock Claim extended southerly in their own direction, but that
44 each and all of said claims of any estate, right, title or interest therein are without merit, unjustified and false and constitute a cloud upon the right, title, interest and estate of this defendant; that said plaintiffs have not, nor has either of them, any right, title or interest whatever in or to the said Black Rock lode claim, or to any portion of said vein or lode, or in or to any of the ores or minerals

therein contained, between planes drawn through the end lines of said claim, and extended as aforesaid.

VIII.

That the said vein or lode, so having its top or apex within the surface boundaries of the said Black Rock lode claim, as aforesaid, is extremely valuable, having a value in excess of $100,000.00.

IX.

That heretofore, to-wit: during the years 1909 to 1914, and while this defendant was the owner, in possession and entitled to the possession of said vein, lode or ledge, and of all metals therein contained, the said plaintiffs, by means of underground levels, drifts and other workings, wrongfully and unlawfully entered into and upon the said vein, lode or ledge, and particularly on that portion thereof that lies between vertical planes drawn through the end lines of said claim and extended as aforesaid, and beneath the surface of, and within the exterior boundary lines of the said Elm Orlu Mining Claim, extended downward vertically, and did wrongfully and unlawfully extract and remove therefrom large quantities of ores and minerals, and
45 did appropriate and convert the same to their own use; that the exact amount of the said ores, so extracted, and the value thereof, is unknown to this defendant. Defendant alleges that said amount is approximately of the reasonable value of $100,000.00. That defendant has no means of ascertaining, with any degree of accuracy, either the amount or value of said ores, so wrongfully and unlawfully extracted and removed by said plaintiffs, except through a discovery and accounting therefor.

X.

That said plaintiffs threaten to, and will, unless restrained by the order of this court, proceed to extract, remove and convert to their own use, from said vein, lode or ledge, of which this defendant has been, and is, the owner of, and entitled to the possession of, as aforesaid, the balance of said ores and metals therein contained, to the irreparable damage of the defendant herein.

Wherefore, defendant prays the judgment and decree of this court:

I.

That the plaintiffs take nothing by reason of their bill of complaint.

II.

That said bill be dismissed as to this defendant, and that the defendant recover its costs herein.

46 III.

That all adverse claims of the said plaintiffs, and each of them, be adjudged and determined by the decree of this court; that by said decree it be adjudged that neither of said plaintiffs has any estate, right, title or interest in or to the Black Rock lode mining claim, or in or to any part or portion of the said vein or lode, so having its top or apex within the surface boundaries of said claim, as aforesaid, lying between planes drawn vertically downward through the end lines of said claim, and extended indefinitely in their own direction southerly; that the court, by its decree, adjudge that the title of this defendant thereto is good and valid, and that plaintiffs, and each of them, be forever enjoined and restrained from claiming or asserting any claim whatsoever in or to the same, or any part or portion thereof; that said plaintiffs, and each of them, and their and each of their agents, servants and employees, during the pendency of this action, be restrained from entering upon, removing or extracting, any ore, or mineral-bearing earth or rock from any part or portion of said vein or lode; that upon the entry of a final decree herein, the said plaintiffs, and each of them, and the agents, servants and employees of each of them, be perpetually enjoined from entering upon, mining, or removing or extracting any ore or mineral-bearing earth or rock whatsoever, from any part or portion of said vein or lode, and that said plaintiffs, and each of them, be ordered and required to account for all ores, metals or minerals extracted from said vein
47 or lode, and that upon such accounting this defendant have judgment and a decree of this court, for the value of such ores, metals, and minerals, so wrongfully and unlawfully extracted and converted by plaintiffs, or either of them, to their, or its, own use; and that defendant have such other and further relief as shall be meet and equitable, and its costs of suit in this behalf.

W. H. DICKSON,
J. BRUCE KREMER,
A. C. ELLIS, JR.,
L. P. SANDERS,
RUSSELL G. SCHULDER,
ALF C. KREMER,
Solicitors for said Defendant.

UNITED STATES OF AMERICA,
District of Montana, ss:

J. Bruce Kremer, being first duly sworn, on oath, deposes and says:

That he is an officer, to-wit: the Assistant Secretary of the Butte and Superior Copper Company, Limited, the defendant herein; that he has read the foregoing answer and knows the contents thereof, and the matters therein stated are true to the best knowledge, information and belief of affiant.

J. BRUCE KREMER.

48 Subscribed and sworn to before me this 26th day of September, 1914.

[NOTARIAL SEAL.] JOHN A. GROENEVELD,
Notary Public in and for the State of Montana, Residing at Butte, Montana.

My commission expires November 5th, 1916.

EXHIBIT A.

This indenture, made and entered into this 29th day of October, 1906, by and between the Clark-Montana Realty Company, a corporation, created, organized and existing under and by virtue of the laws of the State of Washington, and doing business in the State of Montana, party of the first part, and Amasa P. Peake, of Valley City, North Dakota, party of the second part;

Witnesseth: That the said party of the first part, for and in consideration of the sum of one ($1.00) dollar, lawful money of the United States of America, to it in hand paid, the receipt whereof is hereby acknowledged, does remise, release and forever quit-claim unto the said party of the second part, and to his successors forever, all the right, title, interest, claim and demand of the party of the first part in and to that certain portion, claim and mining right, title and property on those certain ledges, veins, lodes or deposits of quartz and other rock in place, containing precious metals of gold,
49 silver and other metals, and situated in Silver Bow County, State of Montana, the following described mining property, to-wit:

An undivided one-fourth (¼) interest in and to that certain quartz lode mining claim, known as the "Black Rock" quartz lode mining claim, designated as Lot No. 53, Mineral Survey No. 596, in Township 3, N. R. 7 W., embracing a portion of Section 6, in Township 3, N. R. 7 W.

It being the intention of the party of the first part to convey to the party of the second part all of its right, title and interest in and to the above described property.

Together with all the dips, spurs and angles, and also all the metals, ores, gold, silver and metal bearing quartz, rock and earth therein, and all the rights, privileges and franchises thereunto incident, appendant and appurtenant, or therewith usually had and enjoyed; and also all the estate, right, title, interest, possession, claim and demand whatsoever of the said party of the first part, of, in or to the said premises, and every part and parcel thereof.

To have and to hold, all and singular, the said premises, together with the appurtenances and privileges, unto the said party of the second part, his heirs and assigns forever.

In witness whereof, the part- of the first part has caused its name to be subscribed, and this deed to be executed by A. H. Wethey, Vice-

President of the party of the first part, and W. M. Bickford,
50 Secretary of the said party of the first part, they being duly authorized to act herein by the Board of Directors of the said party of the first part.

CLARK MONTANA REALTY COMPANY.
B. A. H. WETHEY, *Vice-President.*

Attest:
[CORPORATE SEAL.] W. M. BICKFORD, *Secretary.*

STATE OF MONTANA,
County of Silver Bow, ss:

On this 29th day of October, 1906, before me, W. C. Siderfin, a Notary Public, in and for Silver Bow County, State of Montana, personally appeared A. H. Wethey, known to me to be the Vice-President of the Clark-Montana Realty Company, a corporation, created, organized and existing under and by virtue of the laws of the State of Washington, and doing business in the County of Silver Bow, State of Montana, and W. M. Bickford, known to me to be the Secretary of the Clark-Montana Realty Company, a corporation, created, organized and existing under and by virtue of the laws of the State of Washington, and doing business in the County of Silver Bow, State of Montana, whose names are subscribed to the foregoing instrument, and acknowledged to me that they upon behalf of the said Clark-Montana Realty Company executed the above and foregoing instrument.

51 In Witness Whereof, I have hereunto set my hand and affixed my Notarial Seal on the day and year in this certificate first above written.

[NOTARIAL SEAL.] WM. C. SIDERFIN,
Notary Public in and for Silver Bow County, State of Montana.

Filed for Record Mar. 1, A. D. 1907, at 3 min. past 12 o'clock P. M. Geo. H. Scott, County Recorder, by R. P. Benjamin, Deputy.

Service of the foregoing answer acknowledged, and copy thereof received this 26th day of September, 1914.

JOHN P. GRAY,
GEORGE F. SHELTON,
J. L. TEMPLEMAN,
M. A. FOLSOM,
Solicitors for Plaintiffs.

Filed Sept. 26, 1914. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy.

And thereafter, on the 13th day of October, 1914, reply was filed herein, which is entered of final record as follows, to-wit:

52 In the United States District Court for the District of Montana.

In Equity.

No. 19.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Reply.

Come now the plaintiffs above named, Clark-Montana Realty Company and Elm Orlu Mining Company, and reply to the further answer and counterclaim of the defendant as follows:

I.

Plaintiffs specifically admit each and every allegation, matter and things contained in paragraph I of said further answer.

II.

Plaintiffs admit that the defendant is now, and said defendant and its predecessors in interest have been, since the 24th day of November, 1880, the owners of, in possession, and entitled to the possession of the Black Rock Lode Mining Claim. But plaintiffs deny that the said defendant is now, or that it or its predecessors in interest, have been at any time, the owner of all lodes or ledges throughout their entire depth, the top or apices of which are found within
53 the surface boundaries of the said Black Rock Claim extended downward vertically. Said plaintiffs allege that the Clark-Montana Realty Company is now, and for a long time last past has been, the owner of that certain lode or vein known as the Rainbow Lode, throughout its entire depth, between planes drawn downward vertically through the end lines of the said Elm Orlu Lode Mining Claim and said end lines extended northerly in their own direction, notwithstanding the fact that a portion of one branch of said Rainbow Lode crosses the side lines of said Black Rock Lode Claim, and a portion of the said lode is found beneath the surface of said claim, all of which is more fully set forth in the complaint herein.

III.

Said plaintiffs admit the allegations contained in Paragraph III of said further answer.

IV.

Said plaintiffs admit that patent to the Black Rock Mining Claim was issued as alleged in paragraph IV of said further answer, and that defendant by mesne conveyance has become the owner of said claim. But plaintiffs deny that said patent granted to the predecessors of said defendant that portion of any lode or vein apexing within the surface boundaries of said Black Rock Mining Claim which also apexed in the Elm Orlu Lode Mining Claim, which latter claim is prior in date to said Black Rock Claim..

54 V.

Said plaintiffs deny that there is any vein or lode whatever within the surface boundaries of said Black Rock Mining Claim which at its top or apex and on its course or strike crosses the westerly end line of said Black Rock Mining Claim and thence at its top or apex and on its course or strike continues in an easterly direction between the side lines of said claim for a distance of Eight Hundred Eighteen (818) feet from said west end line, and deny that one fork or branch of the apex of any vein within said Black Rock Mining Claim continues easterly or crosses the easterly end line of said mining claim, or that any fork or branch of any vein, except as hereinafter set forth, continues in a northeasterly direction to or across the north side line of said claim; and in this connection, plaintiff admits that there is one fork of a vein within the said Black Rock Mining Claim, known as the Rainbow Lode, which fork on its course or strike crosses the south side line of said claim, and thence continues northeasterly across the said claim and departs through the opposite side line of said claim, but neither said fork of said vein, nor any part thereof crosses the easterly end line of said claim or the westerly end line of said claim, and plaintiffs allege that one fork of said vein above described crosses the east end line of the Elm Orlu Claim, and the two forks uniting within the Elm Orlu Claim constitute, one lode or vein which continues in a westerly direction until it crosses the west end line of the Elm Orlu Claim.

55 Plaintiffs deny that any vein within the Black Rock Claim which wholly or in part crosses the opposite end line of said claim, dips in a southerly direction, or that any such vein for a portion of its width extends beyond the southerly side line of said Black Rock Claim and to and into the surface of the Elm Orlu Lode Mining Claim.

Plaintiffs deny that the defendant is the owner of, in possession and entitled to possession, or that its predecessors in interest ever

since the 24th day of November, 1880, have been the owners of, or in possession, or entitled to the possession of any vein or lode crossing the west end line of the said Black Rock Claim and extending through the said claim and departing through the east end line of said claim, or the north side line of said claim, or that there is any such vein within the said Black Rock Claim; and said plaintiffs deny that there is any vein within the Black Rock Mining Claim which defendant is entitled to follow either in a southerly direction beyond its south side line, or in an easterly direction as against the plaintiffs herein.

VI.

For a reply to Paragraph VI of said further answer, plaintiffs specifically deny each and every allegation, matter and thing contained in said paragraph.

VII.

Replying to Paragraph VII of said further answer, plaintiffs admit that they claim an interest adverse to defendants in and to a vein or lode which crosses the west end line of the Elm Orlu
56 Claim and continues easterly for a distance of several hundred feet, and one fork of which thence crosses the south side line of the Black Rock Lode Claim and continues thence through said claim, departing through the opposite side line of said claim, and the other fork of which continues easterly and departs through the east end line of the Elm Orlu Lode Mining Claim, and said plaintiffs claim to own and do own said vein or lode throughout its entire depth between planes drawn downward vertically through the end lines of the Elm Orlu Mining Claim extended northerly in their own direction, as alleged in the complaint herein. But plaintiffs deny that there is any vein or lode occupying the position described in the further answer herein.

VIII.

Plaintiffs deny each and every allegation, matter and thing contained in Paragraph VIII of said further answer.

IX.

Said plaintiffs admit that they have during the years 1909 to 1914 mined and extracted ore from beneath the surface of the Elm Orlu Mining Claim from the vein described in the complaint herein as the Rainbow Lode, but said plaintiffs deny that they, or either of them, has during said years or prior thereto extracted any ores or minerals from any vein other than the Rainbow Lode described in said complaint. Said plaintiffs deny each and every other allegation, matter and thing contained in Paragraph IX of said further answer.

57 X.

Said plaintiffs specifically deny each and every allegation, matter and thing contained in Paragraph X of said further answer.

Wherefore, plaintiffs pray the judgment and decree of this court:

1. That defendant take nothing by reason of its further answer and counterclaim.

2. That said further answer and counterclaim be dismissed as to the plaintiffs and that plaintiffs recover their costs.

3. That plaintiffs be awarded the relief prayed for in the complaint.

JOHN P. GRAY,
GEORGE F. SHELTON,
J. L. TEMPLEMAN,
M. A. FOLSOM,
Solicitors for Complainants.

UNITED STATES OF AMERICA,
District of Montana, ss:

W. D. Mangam, being first duly sworn, on oath, deposes and says: That he is an officer, to-wit, the Secretary of the Elm Orlu Mining Company, one of the plaintiffs herein; that he has read the foregoing reply and knows the contents thereof, and the matters stated therein are true to the best knowledge, information and belief of affiant.

W. D. MANGAM.

58 Subscribed and sworn to before me, the undersigned, this 12th day of October, A. D. 1914.

A. C. McDANIEL,
Notary Public for the State of Montana, Residing at Butte.

Commissioned for a term expiring Dec. 10th, 1915.

Due service of the foregoing Reply admitted and copy thereof received this 12th day of October, 1914.

W. H. DICKSON,
A. C. ELLIS, JR.,
RUSSELL G. SCHULDER,
J. BRUCE KREMER,
L. P. SANDERS,
ALF C. KREMER,
Attorneys for Defendant.

Filed Oct. 13, 1914. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy Clerk.

And thereafter, on the 22nd day of January, 1916, findings were filed herein, which are entered of final record as follows, to-wit:

United States District Court, Montana.

CLARK-MONTANA REALTY CO. et al.

vs.

BUTTE & SUPERIOR COPPER CO.

Herein, the Court finds:

(1) That the Elm Orlu claim was located before the Blackrock aim was located.

(2) That the north wall of the Rainbow vein apex crosses the ommon side line between said claims—190—feet from the south- st corner of the Blackrock claim, and that the south wall of said ein apex so crosses—301—feet from said corner.

(3) That the Pyle strand of the Rainbow vein diverges from the outh side of the latter vein in the Elm Orlu claim, and there and or some indefinite distance easterly has its apex in the Elm Orlu laim.

(4) That the Jersey Blue vein apexes in the Blackrock claim, does ot unite with the Rainbow vein, and crosses on strike and dip the Rainbow vein, on strike east of the Rainbow apex crossing of the ommon side line.

(5) That the Creden vein diverges from the north side of the Rainbow vein in the Elm Orlu claim, and has its apex in both the Elm Orlu and Blackrock claims.

(6) That the apex of the easterly strand of the Rainbow vein in he Blackrock claim, terminates at a point within said claim east of he Elm Orlu east end line projected and about—250—feet west of the Blackrock east end line.

(7) That prior to the Blackrock location and patent entry, both the Rainbow vein and the Jersey Blue vein at their apices were discovered and known within the Blackrock claim and at their apices appeared as a continuous east-west vein.

(8) That each party has mined the ore bodies of the other in the claims involved.

And therefrom the Court concludes:

(1) That plaintiff owns all ore bodies in the Rainbow vein between the Elm Orlu west end line and a parallel line projected from where the south wall apex of said vein crosses the common side line, or about 980 feet of said vein.

(2) That the defendant owns all ore bodies in the Rainbow vein between the projected Elm Orlu end line at the south wall apex crossing of the common side line by said vein and the east end line of the Blackrock claim, or about 1200 feet of said vein.

(3) That plaintiff owns all ore bodies in the Pyle strand from its divergence at its west end from the Rainbow vein in the Elm Orlu claim easterly as far as the apex of said strand is within said claim, and between Elm Orlu end lines projected, and defendant owns all thereof east of the projected east end line last aforesaid.

(4) That defendant owns all ore bodies in the Jersey Blue vein between the points where the apex departs from defendant's premises across end lines as laid or projected, throughout depth
61 save at its intersection or crossing of the Rainbow vein between Elm Orlu end lines as laid and projected.

(4-2) That plaintiff owns all ore bodies in the Creden vein from its divergence at its east end from the Rainbow vein westerly as far as the Creden apex is within the Elm Orlu claim between Elm Orlu end lines there projected, and defendant owns all thereof west of the projected west end line last aforesaid.

(5) That accounting in damages be had.

(6) That each party pay its own costs, and the decision herein is made a part hereof. An appropriate decree will be entered.

BOURQUIN, *J.*

Jan. 22, 1916.

And thereafter, on the 6th day of July, 1916, decree was filed and entered herein, which is entered of final record as follows, to-wit:

In the United States District Court for the District of Montana.

In Equity.

No. 19.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

62 *Decree.*

This cause came on to be further heard at this term, and was argued by counsel; and thereupon, upon consideration thereof, it was ordered, adjudged and decreed, as follows:

I.

Plaintiff, Clark-Montana Realty Company, is the owner of and entitled to the possession (subject to the rights of its co-plaintiff and tenant, Elm Orlu Mining Company) of the Elm Orlu lode mining claim situated in Silver Bow County, Montana, as described in the United States Mineral Patent issued therefor, and of all veins apexing therein within said claim's end line planes, so far as their apices are within said claims throughout depth and tho dipping beneath defendant's premises.

II.

The defendant Butte and Superior Copper Company, Limited, is the owner of, and entitled to the possession of the following quartz lode mining claims situated in Silver Bow County, Montana, as described in the respective United States Mineral Patents issued therefor, namely, the Black Rock Lode claim, the Jersey Blue Lode claim, the Admiral Dewey lode claim and the Silver lode claim.

63 III.

The Elm Orlu lode mining claim was located prior to the location of any of said claims of the defendant, and is senior in date of location, and superior in mining rights accruing by reason thereof over any and all of said mining claims of the defendant.

IV.

Plaintiff Clark-Montana Realty Company, by virtue of its ownership of the Elm Orlu lode claim, is the owner of and entitled to the possession (subject to the rights of said Elm Orlu Mining Company), of all that part of the Rainbow vein throughout its entire depth between a plane drawn downward vertically through the west end line of the Elm Orlu lode claim, and extended northerly and southerly indefinitely in its own direction, and a parallel plane thereto drawn downward vertically through a point on the south side line of the Black Rock claim 301 feet easterly of the southwest corner of the Black Rock claim, measured along the south side line thereof, and projected northerly and southerly indefinitely in its own direction, as against all rights and claims whatsoever asserted by the defendant herein. The ore bodies in said vein lie beneath the said Elm Orlu, Black Rock, Admiral Dewey, Silver and Jersey Blue claims. The course of said west end line of the Elm Orlu claim is north 15 degrees west.

64 V.

Plaintiff Clark-Montana Realty Company is the owner of and entitled to the possession (subject to the rights of said Elm Orlu Mining Company), of all that portion of the Creden vein throughout its entire depth from its divergence at its east end from the Rainbow vein westerly as far as the apex of the said Creden vein is within the Elm Orlu claim, and between parallel planes drawn vertically downward, the one through the easternmost point of the top or apex of the Creden vein at its divergence from the north side of the Rainbow vein, and the other through the westernmost point where the said Creden vein on its course and at its top or apex crosses the southerly side line of the Black Rock claim,—each of said bounding planes to be extended indefinitely northerly and southerly in its own direction, and to be parallel with the end lines of the Elm Orlu claim, which said end lines have a course of north 15 degrees west.

VI.

Plaintiff Clark-Montana Realty Company is the owner of and entitled to the possession (subject to the rights of said Elm Orlu Mining Company), of all that portion of the Pyle strand or vein throughout its entire depth as far as its apex is within the Elm Orlu lode mining claim from its divergence at its west end from the Rainbow vein in the Elm Orlu claim easterly as far as the apex of said vein or strand is within said claim,—the rights of the said plaintiff upon said vein to be bounded on the east by a plane drawn
65 downward vertically parallel to the west end line of the said Elm Orlu claim through the point where the south wall of the Pyle strand or vein at its top or apex and on its course passes out of the Elm Orlu claim, and on the west by a parallel plane thereto drawn downward vertically through the westernmost point of said Pyle vein at its divergence from the Rainbow vein within the Elm Orlu claim, and such bounding planes extended indefinitely northerly and southerly in their own direction.

VII.

It is further adjudged and decreed that all claims of said defendant, and all persons claiming, or to claim, by, through or under it, to said veins or any thereof, which *my* this decree are adjudged to be the property of the plaintiffs, are invalid and groundless; that plaintiff Clark-Montana Realty Company's title to the said Elm Orlu claim and all ores and minerals therein contained, except such as are awarded by this decree to defendant, and such parts of all veins having their apices therein, as are adjudged to belong to plaintiff Clark-Montana Realty Company, be quieted against all claims, demands or pretensions of defendant; and said defendant is hereby perpetually restrained and enjoined from setting up or asserting any claims thereto, or to any part thereof; and said defendant is perpetually enjoined from entering into or upon any portions of such veins or premises hereinbefore described and adjudged to be
66 the property of the plaintiff Clark-Montana Realty Company.

VIII.

Defendant Butte and Superior Copper Company, Limited, is the owner of, and entitled to the possession of that portion of the Rainbow vein throughout its depth lying easterly of a plane parallel with the west end line of the Elm Orlu lode claim drawn downward vertically through a point on the south side line of the Black Rock claim 301 feet easterly of the southwest corner of said claim, measured along the south boundary of said Black Rock claim, and extended northerly and southerly indefinitely.

IX.

Defendant, Butte and Superior Copper Company, Limited, is the owner of and entitled to the possession, as against plaintiffs, of all the Jersey Blue vein throughout its entire depth lying easterly of a plane drawn downward vertically through the west end line of the Black Rock claim extended indefinitely northerly and southerly, save at its intersections or crossing with those portions of the Rainbow, Pyle, Creden or other veins apexing in the Elm Orlu claim, and being the property of the plaintiff Clark-Montana Realty Company, as herein decreed; and said plaintiff is entitled to all ore or mineral contained within such spaces of intersection.

67

X.

Defendant, Butte and Superior Copper Company, Limited, is the owner of, and entitled to the possession of all that portion of the Creden vein throughout its entire depth as far as the apex of said Creden vein is within the Black Rock lode claim, and between vertical planes drawn downward, the one through the west end line of the Black Rock claim, and the other, with a course of north 15 degrees west, through the westernmost point where the said Creden vein on its course and at its top or apex crosses the northerly side line of the Elm Orlu claim, and said planes extended indefinitely in their own directions.

XI.

Defendant, Butte & Superior Copper Company, Limited, is the owner of and entitled to the possession of all that portion of the Pyle strand or vein throughout its entire depth as far as its apex is within the Black Rock lode mining claim, and easterly of a plane drawn downward vertically parallel to the west end line of the Elm Orlu claim at the point where the south wall of the Pyle strand or vein at its top or apex passes out of the Elm Orlu lode claim.

XII.

It is further adjudged and decreed that all claims of said plaintiffs, or either of them, and all persons claiming, or to claim, by, through, or under them, to said veins, or any part thereof, which by this decree are adjudged to be the property of defendant,

68 are invalid and groundless; that defendant's title to said Black Rock claim and such parts of all veins therein as are adjudged to belong to said defendant, be quieted against all claims, demands, or pretensions of plaintiffs, or either of them; and said plaintiffs are hereby perpetually restrained and enjoined from setting up or asserting any claims thereto or to any part thereof; and said plaintiffs are perpetually enjoined from entering into or upon any portion of such veins and premises hereinbefore described and

adjudged to be the property of defendant, Butte and Superior Copper Company, Limited.

XIII.

It is further ordered, adjudged and decreed that for ores extracted before the commencement of this suit by the defendant from the Elm Orlu lode claim, and from the ore bodies west of the 301 foot plane, and herein adjudged to belong to the plaintiffs, that the plaintiffs do have and recover from the defendant the sum of $177,704.40 (one hundred seventy seven thousand, seven hundred and four 40/100 dollars), with interest thereon from and after the first day of June, 1916, at the rate of 8% per annum; and that plaintiffs have execution against the defendant therefor in the usual form.

XIX.

It is further ordered, adjudged and decreed that the defendant do have and recover nothing of and from the plaintiffs for any
69 ores removed by the plaintiffs prior to the commencement of this suit.

XV.

Each party shall pay its own costs.

Done in open court this 6th day of July, 1916.

GEO. M. BOURQUIN, *Judge.*

Filed and entered July 6, 1916. Geo. W. Sproule, Clerk.

Wherefore, said pleadings, process and final decree are entered of final record according to the law and practice of this Court.

Witness my hand and seal of said Court at Butte, Montana, this 6th day of July, A. D. 1916.

[COURT SEAL.]

GEO. W. SPROULE, *Clerk,*
By HARRY H. WALKER,
Deputy Clerk.

Final Record.

Filed and entered July 6, 1916. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy Clerk.
Ent., J. D., No. 2, Page 130.

United States District Court, Montana.

CLARK-MONTANA REALTY CO. et al.

vs.

BUTTE AND SUPERIOR COPPER CO.

Opinion.

An apex controversy, both parties seeking to quiet title and damages. The premises are in the Butte district. The Realty Co., called plaintiff, owns the Elm Orlu claim, and defendant owns the Blackrock and other claims. Only the two named need be referred to save in the decree. They have a common side line for 850 feet of the Elm Orlu east end and of the Blackrock west end.

It is now admitted that the Rainbow vein at the apex crosses the Elm Orlu west end line, courses easterly, crosses the common side line and branches in the Blackrock, one strand crossing the Blackrock north side line and one coursing easterly a disputed distance; that the Pyle strand of the Rainbow at some depth in the Elm Orlu diverges from the south side of the said vein and coursing easterly unites with the Rainbow at the Blackrock 1,100 level; that the Jersey Blue vein at the apex crosses the Blackrock west end line and courses easterly a disputed distance, it and the Rainbow converging on strike and dip to union or crossing; that the Creden vein at some depth in the Elm Orlu near the Blackrock west end diverges from the north side of the Rainbow,
71 courses northwesterly under both claims and unites with or is cut off by the Jersey Blue. Very large ore bodies are in the Rainbow under both claims, at places bisected on strike by the common side line, and both parties have mined them under both claims. From various names of the veins those herein are chosen to avoid confusion. The issues remaining are as follows:

Plaintiff alleges that the Elm Orlu is the older location, and defendant alleges the Blackrock is. Plaintiff alleges that the apex of the Pyle strand is in the Elm Orlu and crosses the Elm Orlu east end line, and that the vein on strike and dip unites with the Rainbow vein; and defendant denies all thereof at points east of the Rainbow apex crossing of the common side line that would give extralateral rights to plaintiff. Defendant alleges that the Rainbow and Jersey Blue unite on strike and dip, and plaintiff denies it and alleges that on strike and dip the latter crosses the Rainbow. Defendant alleges the easterly strand of the Rainbow crosses the Blackrock east end line, and plaintiff denies it. Defendant asserts some ownership of ore bodies under both claims by virtue of estoppel by deed executed by plaintiff to defendant's predecessor in interest, and plaintiff denies estoppel. Both parties allege and deny trespass and damages, and accounting is deferred. Appropriate legal consequences and rights are asserted by both parties. The trial consumed 16 days. There

are nearly 1,600 pages of testimony, and 130 exhibits. Maps and models are duplicated, save in more or less theoretical geology from which unwarranted impressions are to be avoided. The testi-
72 mony is of five experts for each party, all men of eminence in geology or mining engineering or both. For plaintiffs are Greene of Butte, Irving of Yale, Weed of New York, Searls of Nevada, and Winchell of Minneapolis. For defendant are Finch of Denver, Emmons of Minnesota, Salisbury of Chicago, and Burch and Wiley of California. There is some conflict of facts and more of argument, opinions and conclusions. Most of it can be imputed to the complex geological and other problems, conditions underground, difficulties of observation, and honest differences of interpretation by reasonable and learned men. But in instances partizanship apparently impaired judgment. As a whole, however, the testimony inspires confidence and deserves careful consideration. The judge gave two days to inspection of the premises, but since some places in evidence had been stoped and others obscured by fallen ground or timbering, with intermittent crevices and small openings through which to peer and distinguish granite, altered and otherwise, slips, faults, gouges, aplite, quartz seams and veins, he has not been greatly aided to determine what evidence is more credible and weighty.

The complexities which learned doctors studied for weeks, months or years (which to solve at a minor point one of defendant's witnesses said was beyond him, in that it would take a year's study), and now disagree upon, are not much clearer now than before that hurried passage through many workings.

73 In the matter of priority of location, plaintiff attached to the complaint as exhibits a copy of the declaratory statement of each claim, alleged the locations, that based thereon patent had issued upon each claim, and defendant by answer in effect admits all thereof. Plaintiff offered in evidence the patent proceedings, and introduced oral testimony of the Elm Orlu location, to all of which defendant objected that both locations were invalid when made, and neither could be established save as of date of patent entry. Defendant's patent entry is the older and on it defendant relies as the date of the Blackrock location. The Elm Orlu declaratory statement recites location of the "lode" in April, 1875, and it was recorded a few days later, and that of the Blackrock recites location of the "claim" in November, 1875, and it was recorded a few days later. At that time a Montana statute provided that all discoverers of lodes or veins "shall" record a declaratory statement thereon "on oath," but prescribed no forfeiture for noncompliance. The oral testimony sufficiently proves that at least in 1875 and shortly after the Blackrock location its owners knew the Elm Orlu was then claimed; that at least in 1876 a vein had been discovered in the Elm Orlu and the corners staked; and that thereafter annual labor was continuously performed, the claim leased and ore mined, and it was well known and to the knowledge of the owners of the Blackrock thenceforward. In November, 1880, the Blackrock owners applied for patent, based

on the aforesaid declaratory statement, no adverse claim was
74 filed, entry was made, and patent issued in February, 1882.
In December, 1882, the Elm Orlu owners applied for patent, based on its aforesaid declaratory statement. The proceedings showed and excluded a conflict area with the Blackrock and theretofore included in the Blackrock patent. Entry was made and patent issued in January, 1884.

The verifications to said declaratory statements were defective in that in substance each of them merely recited that the locators were citizens and that the instrument was a copy of the original notice of location posted on the claim. In 1885 the Montana Territorial Supreme Court first held that for like defective verification the declaratory statement was void. Later, this was expanded to hold the location also was void. See Hickey vs. Mining Co., 81 Pac. 810. And that continued the rule of decision until 1907, when it was modified by statute providing that the record of the certificate of location is for constructive notice, that a certified copy thereof is prima facie evidence of all facts properly recited in the certificate of location, and that no defect is material save in favor of subsequent locators "in good faith and without notice." All rights to the premises involved had become fixed and vested by patents prior to the said rule of decision. Hence, it is the right of the parties to have and the duty of the court to exercise its independent judgment upon the validity and effect of the declaratory statements and locations; and
though for comity and to avoid confusion the court leans to
75 agreement with the State tribunal, if in its judgment the State rule of decision is unsound it must refuse to follow it. See Kuhn vs. Coal Co., 215 U. S. 353.

A location and its record are different things. The Federal and most State statutes distinguish between them, the former even in authorizing local rules "governing the location" and "manner of recording." The statutory object is to protect and reward discoveries of mines. Discovery with intent to claim is the principal thing, and vests an estate—an immediate fixed right of present and exclusive enjoyment in the discoverer. The record is incidental machinery to secure to the discoverer his reward and to give notice to others. The spirit of all recordation acts is notice to protect others against secret equities. If the record is not necessary to create the estate (as it is in the matter of homestead exemptions and mechanics' liens), the statute providing for recording is but a direction to do certain acts and does not create conditions-subsequent; and if the statute provides no forfeiture for failure to record, by failure the estate is not divested. Recordation of mining locations can not be a condition-precedent, for the estate arises before recordation is to be performed.

If the Montana statute made recording of the nature of conditions-subsequent (of feudal origin), at common law such conditions are to be but substantially performed, and no assignee of part of the premises to which the conditions attach can take advantage of their
breach; and the owners of the Blackrock securing the conflict

76 area were at most assignees of but part of the Elm Orlu premises. The United States forfeited neither claim for defective verification—if a breach of condition-subsequent. The estate in neither, if voidable, was avoided. Both were confirmed and patented. Where Congress intended forfeiture of mining and other public land claims for breach of conditions-subsequent it plainly said so; vide forfeiture for failure to perform or contribute to annual labor. Recording acts that expressly provide forfeiture for failure to comply with them do so in favor of only subsequent bona fide claimants. Forfeitures are odious and not to be implied. Prior to patent entry of these claims, a Montana statute provided that all ambiguous statutes should be constructed "in favor of natural right"; and it would not have been too far-fetched to apply it to the statute directing recordation of mining claims. In 1875 Montana was indeed primitive. Those learned in the law were few. It is doubtful if there was a lawyer in Butte. The prospectors, pioneers and founders of this wonderful West, seeking in good faith to comply with the recordation law, for mere technical failures therein should not have been subjected to so harsh a construction of that statute and deprived, as many of them were, of their discoveries. And deprived for whom? Subsequent bona fide discoverers and locators? No: as a rule for those unspeakable creatures who search public records to discover and take advantage of defects in their neighbors' titles.

77 These statutes are of no more force and effect than miners' rules. Both are authorized by the one Federal statute. The better if not prevailing rule always has been that if the recordation law does not expressly provide forfeiture for failure to record, the location is valid though not recorded. That is the rule of this Circuit. Last Chance Mining Co. v. Bunker Hill Mining Co., 131 Fed. 586.

In Yosemite Mining Co. vs. Emerson, 208 U. S. 30, the Supreme Court held that one with knowledge of the existence of a mining location, could not take advantage of the locator's failure to post two notices required by local rule, he having posted but one, the rule not providing for forfeiture, in that he had all the information the notice was designed to give; and that to hold that the failure to post the second notice "would work a forfeiture, would be to permit the rule to work injustice and to subvert the very purpose for which it was enacted."

True, the posted notice is temporary, and the recorded one, permanent. But the principal is the same, viz., that the failure to comply with local rules or statutes that do not prescribe forfeiture as a consequence, is immaterial so far as those with knowledge of the locations are concerned. If one such statutory requirement does not imply forfeiture for failure, why should another? If in the case cited partial failure was not fatal, why should it be in the case at bar? No reason appears why the rule of the Yosemite Case does not control this at bar. The State rule of decision, now set aside

78 by statute, does not commend itself as sound and cannot be followed here.

From the declaratory statements, it appears the Elm Orlu is the older location; and if we reject both statements by oral testimony the same fact appears. In the matter of plaintiff's contention that the Elm Orlu is the older for the additional reason that it was exclusively possessed and worked for the local period of limitations for the recovery of real property, prior to the Blackrock patent entry, and secured thereby the equivalent of a valid location, the evidence is not sufficiently clear and definite to prove it. And in the matter of defendant's contention that in any event the Blackrock is the older by reason of a conclusive presumption created by its patent for the conflict area, citing the Stemwinder Case, it suffices to say that it seems that the cited case is superceded by the Lawson Case, 207 U. S. 1. The principle of the Lawson Case is that if to a patent application there is not filed and in court tried and determined an adverse claim, the patent proceedings decide nothing, save that the applicant is entitled to a patent for the surface area applied for. That is the decision, though the court proceeded to fortify it by elaboration that might confuse. The land department does not determine nor try priorities (for it has no jurisdiction to do so) farther than that entry made and patent issued is by it an implied if not express conclusive determination that to the surface area entered and patented the patentee has priority. Although the applicant is a subsequent locator, if the prior locator does
79 not file an adverse claim and litigate it in the proper court, the law directs that patent shall issue to the applicant. A protest filed in the land office by the prior locator would be ignored. Public policy forbids that a prior locator cannot abandon and refuse to litigate the conflict area claimed by a subsequent locator without creating a presumption to his prejudice in respect to the remainder of his claim. Whether he abandons the conflict because of fear or favor or pure indifference is immaterial. And not claimed, or if abandoned, there is no conflict, even though location lines overlap. Locations are of surface, including veins. In so far as there is no conflict, if the United States do not avoid a location for defective compliance with local rules, and issue patent, the patent vests all the extralateral rights appropriate to the veins within that surface and as of date of discovery, of which no third party can complain. Defendant admitting that the exhibit to the complaint is the Elm Orlu declaratory statement, that none other was recorded, that all Elm Orlu patent proceedings were based thereon, of necessity in substance admits the Elm Orlu patent issued upon said declaratory statement and invokes the principle of the Lawson Case against itself. And the facts were also proven—as potent as stipulation or other admissions.

The court finds that the northerly wall of the Rainbow apex crosses the common side line 190 feet from the southwest corner of the Blackrock and that the southerly wall so crosses 301 feet from said corner.

80 For plaintiff the testimony is that the latter crossing is "about" 308—"rather the extreme and indefinite limit of

the mineralization which accompanies the vein"—to 314 feet; for defendant, "about" 300 to 301 feet. All agree there is no defined wall, that it is indefinite and leaves much to judgment. Considering the evidence in light of inspection and that the burden of proof is upon plaintiff, it is believed that the concession of defendant is more nearly right and as favorable to plaintiff as the facts warrant. The exposure is in a surface trench, and it is difficult to distinguish vein matter in place from mere seepage effect in adjacent country, whether of vein solutions or surface waters, and perhaps mushrooming beyond the limits of the vein proper below. A shaft might have contributed to accuracy. Finch testified that within the limits of the 300 feet he included 15 feet to the extreme limit of rock alteration, with a few little seams in it, "to be consistent with the interpretation of a vein at other points." This is admirable frankness, but imports that at vital points and to indefinite extent he characterized that as vein which in his judgment is not vein, to serve his client and avoid hazard of comparison. The difficulty is that when an expert shades his testimony upon the principle of do ut des, partizanship is likely, if not certain, to favor his client, and the court cannot determine to what extent; inevitably detracting from the weight of his opinion.

81 Adverting to the Pyle strand, it is known to diverge from the south side of the Rainbow at and above the Elm Orlu 1200 level, and coursing easterly and at points 100 feet south of the Rainbow, it crosses the common side line at the elevation of the Blackrock 1100 level 250 feet west of the Elm Orlu northeast corner, and unites on strike and dip with the Rainbow in the Blackrock at said level, 230 feet east of said crossing and 60 feet north of said corner. At this union it is a strong vein, 15 feet wide. 100 feet west of the union there is a raise upon the Pyle, which, offsetting west, ends 40 feet above the Elm Orlu 500 level. In this raise the Pyle dips vertical to the Blackrock 800 level, then north 75 degrees to the union. The Pyle dwindles in width going upward. It is known in the raise to 40 feet below the Elm Orlu 500, and there it may be cut off by a southerly dipping gouge slip, or this latter may be the Pyle fissure extending upward, the mineralization there having ceased, temporarily or permanently. If this gouge slip continues to surface and with the dip it has in the raise, it would roughly approximate to Rainbow dip and apex in the Blackrock. In some zigzag workings from the raise in the Elm Orlu 500 the Pyle appears, if at all, in small, irregular, dislocated quartz seams and gouge. This is the greatest elevation at which the Pyle has been identified throughout a block from the raise to the Elm Orlu east end line, 150 feet; to the Rainbow west, 475 feet; to the Elm Orlu north side line, 50 to 150 feet; and to surface, 380 to 410 feet. The Pyle has the characteristic branching of the Rainbow.

82 East of the raise and on the various Blackrock levels below the Elm Orlu 500, the Pyle or its branches have been developed easterly. At the Blackrock 800 level, an erratic, branching strand has been followed easterly, and one branch of a few inches in width crosses the Elm Orlu east end line. At its western end, the Pyle has been

developed at its union with the Rainbow on various Elm Orlu levels below and perhaps to the 500.

Three hundred and fifty feet above the raise, the country has been thoroughly crosscut by the Clark Tunnel and connected workings, in which are slips, seams and more than fifteen small veins, some in each claim, some of those in one claim as reasonably to be correlated with the Pyle as those in the other. These premises are filled with slips, gouges, seams, veinlets and veins, and will not permit correlation nor projection of small features like the Pyle at the Elm Orlu 500, save for slight distances. Plaintiff's witnesses are in doubt whether the Pyle ends in the raise or continues to surface. Defendant's witnesses incline to the opinion it continues upward; that the southerly-dipping slip in the raise is the Pyle fissure and should apex in the Blackrock. This slip if the Pyle fissure, may contain ore above, though mineralization ceased in the raise, and have its apex in some indefinite place above. Where is the apex of that part of the Pyle at the union on the Blackrock 1100 level, is conjecture. Even if that "sliver" of the Pyle crossing the Elm Orlu east end line at the 800 level could serve as a vein to confer extralateral rights,

where is its apex and whether on dip it unites with the Rain-

83 bow, are also conjecture. And to what extent, if at all, the Pyle from its western divergence from the Rainbow unites with the latter on dip is not apparent. At the west it may be a part of the considerable ore body in which is the Bruce raise and may go down vertically indefinitely, or end in lenticular form or feather out and not unite on dip with the Rainbow.

The patent presumption that the apex of a vein in the Elm Orlu, discovered before entry, extends across the east end line cannot attach to the Pyle; and all that is proven is that the Pyle is known at its western divergence from the Rainbow and at other points, making it clear that at the points of divergence and for some undefinable distance easterly its apex is in the Elm Orlu.

Whether the Jersey Blue unites with the Rainbow is the most contested issue. In view of the finding that the Elm Orlu is the older location, each party contends against its own interest. During the trial and argument for defendant, it was admitted that the Rainbow apex crosses the Elm Orlu west end line and the common side line; that from its apex in the Elm Orlu on its dip it extends under the Blackrock; that the great ore body in dispute west of the apex crossing at the common side line, under both claims and in places bisected on strike by said side line, is in said vein; and that it extends downward to the uttermost depths. These facts are conclusively proven as well. This admission overcomes the common-law presumption that defendant owns that part of that ore body

84 under the Blackrock west of the apex crossing, and imposes upon defendant the burden of proving by a preponderance of the evidence (1) that the Blackrock is the older location, (2) that the Jersey Blue unites with the Rainbow above any part of that ore body by defendant claimed. The whole is a single ore body under both claims, the apex of the whole being in the Elm Orlu. To avoid the otherwise inevitable legal consequences, the defendant

must prove the union of veins even as it must prove the estoppel by deed it alleges. And this burden cannot be sustained by leaving the issue in doubt or balance. This is clear in respect to (1) that part of the ore body above the alleged union and under both claims, (2) that part of it below the union and under the Elm Orlu. And so is it in respect to that part of the same ore body below the union and under the Blackrock. Defendant confesses and avoids. In equity, as at law, if a fact is admitted and another fact is averred to avoid it, the fact admitted is proven, with all its consequences, and stands as though the fact in avoidance had not been averred, unless the latter also is proven. See Clement vs. Nicholson, 6 Wall. 315. Of course, a fact admitted at trial is proven, even as though admitted in answer on oath. Otherwise, perjury in pleadings would be encouraged. And the plaintiff is required to only offset defendant's evidence that the veins unite. It is not required to prove they cross. The question or issue is, Do they unite?—and evidence that they cross is only in support of the denial that they unite. Hence,
85 if upon all the evidence the alleged union is in doubt or balance—in doubt or balance whether they unite or cross—the finding must be that they do not unite, even though the evidence would not warrant a finding that they cross. Any extended review of the evidence is impracticable, but a general survey of it will aid in determining the issue.

The premises are in granite country. The Rainbow is of an east-west vein system of the first fissuring resulting in veins in the district. When these veins were well mineralized, there occurred a northwest system of fissures crossing the east-west veins, often very obscurely (and which were also mineralized in the latter age of east-west vein mineralization, but to a less degree), designated as "Blue" veins. Of the "Blue" veins at least three are in these premises, the Deadwood, which crosses and faults the Rainbow near the Blackrock discovery shaft; the Copper, which to some extent also crosses and faults the Rainbow, is itself irregular and dislocated by faults and is in the southwest part of the Elm Orlu, and a nameless one, of which little is known, near the center of the Elm Orlu.

Plaintiff classifies the Jersey Blue as a "Blue" vein, and defendant denies it, contending it is a strand of the Rainbow and an east-west vein. The Rainbow is one of the greatest veins in the district. It was early and extensively mined for some two miles in length, and in places to 1500 feet in depth. In general, it is a broad zone of multiple and complex shattering, wherein largely by replace-
86 ment mineralization occurred; at some places in a wide, continuous vein; at others in several roughly parallel strands which may unite on strike or dip, or both; at others in detached lenticular bodies; at others in spurs or strands diverging from the main portion on strike, dip or rise, and either feathering out or ending in lenticular form. At places in these premises it is 200 or more feet in width and largely commercial ore, while at others it narrows to a few feet, if not to a mere fissure, so far as ore is concerned. It has been greatly disturbed and faulted, not only by the "Blue" veins and other northwest fractures, but also by a later, great

ies of multiple post-mineral fractures, designated the Blackrock
ılt. In these premises, the general course of this fault is that of
e Rainbow. It is sometimes in four or more strands, sometimes
rallel in and along the Rainbow, branching and uniting, some-
nes in the vein or along and now the old wall of the vein or itself
fining the line of least resistance at the limits of mineralization,
d now itself the wall of the vein perhaps sometimes a strand in the
rsey Blue, sometimes diverging into the country. The direction
d extent of movement along it is vague. The several segments of
untry and vein between its strands all may have diversely moved.
ost of the witnesses appear to believe the south side moved west
least, though Emmons testifies that to seek the segment of the
rsey Blue vein on the south side of the Rainbow and the Blackrock
ult, if it crosses them, you could look for two hundred feet either
way from the Jersey Blue vein on the north side. The Rain-
7 bow apex in the Elm Orlu is from fifty to one hundred feet
wide. It dips steeply south to the Elm Orlu 800 level, then
atly north, 55 degrees. It is probably that the Rainbow or a strand
f it also descends vertically, having branched near or below where
dips flatly north. As it descends, it widens. Where from the
rest it approaches and crosses the common side line, it may be two
undred feet wide, largely of commercial ore; and of these mag-
ificent dimensions it courses easterly practically throughout the
Blackrock. The Jersey Blue at the Blackrock west end line is two
undred and fifty feet from the Rainbow. It courses more easterly
han the latter and is of a dip more steeply maintained, so that from
urface somewhere three hundred feet east of the Rainbow apex
rossing of the common side line to beyond the Black Rock west
nd line and there 1300 to 1600 feet below the surface, the two veins
have converged to union or nonunion if not crossing.

The Jersey Blue is relatively regular and narrow, two to thirty feet in width. It is little mineralized, especially in the upper levels, having less than one per cent stoping ground, the Rainbow having forty to fifty per cent. Even at the point where it does or does not unite with the Rainbow, it is relatively small, sometimes about two feet in width, and poorly mineralized, in striking contrast to the great ore body at that point and above and below it in the Rainbow. So little is the worth of the Jersey Blue that in argument it is char-
acterized by defendant's counsel as "not worth six pence
88 * * * the insignificant Jersey Blue vein which don't
amount to a hill of beans anyway." And this is so for a thousand feet of length that it is known and to 1,300 feet in depth. As these veins converge, the country between them is somewhat fractured and mineralized, at places having some commercial value.

Defendant's witnesses describe this as more or less conjugated, fracturing but forming a "horse tail" structure, uniting the two veins, though Emmons testified it did not make them one vein, but is an ore body between the veins. Finch imputes it to tension, fracturing; Emmons to that of compression. It is apparent that they include in this "horse-tail" structure much that is internal transverse structure of the Rainbow and south of the Rainbow's well-

defined hanging wall. Defendant's maps show it, and it is clear from the testimony of Finch and Emmons. When they admit that the Rainbow hanging wall is in the raise from the Blackrock 1,300 level (and it is also conclusively proven), they admit the Rainbow hanging wall both ways from the raise and north of the "horse-tail" structure. Finch testified that south of said hanging wall the Rainbow structure parallels the wall and south of that is the "horse-tail" structure transverse the Rainbow, pointing to the Elm Orlu 1,300 level stopes. They also testified that this "horse-tail" structure diverges from the south side of the Jersey Blue and extends to the north hanging wall of the Rainbow, pointing it out on defendant's maps, where it is so painted, but—in wholly undeveloped country.

89 This mineralization outside of and between the veins is of little extent and consequence. It doubtless at some places extends from vein to vein, and some thereof in transverse fissures. But little of it is of commercial value, and it by no means merges the veins. Both, as Emmons testified, retain their identity by reason of a "pretty definite limiting zone outside the two master fractures" of the two veins. It is not near as extensive as painted by defendant; otherwise and if Finch's theory is correct (all the fissuring here is steep and seems normal—of tension), it ought to also appear where it does not, north of the veins at depth where the north country is the hanging wall side. The fracturing may be there, but not the mineralized "horse-tail" structure; and it is fair to infer that the mineralization between the veins came in connection with the great mineralization of the Rainbow and little from the barren Jersey Blue. These two veins have points of resemblance, but more of difference. The Jersey Blue more approximates to the "Blue" veins than to the Rainbow. Defendant's witnesses are of the opinion the Rainbow and Jersey Blue are of the same age and unite, the latter a strand of the former. Plaintiff's witnesses are of contrary opinion. The latter definitely describe places where the Jersey Blue crosses the Rainbow, from observation. But it is difficult to determine whether the testimony of defendant's witnesses that the veins unite is theory, inferences from or reflection of defendant's maps or actual underground observation. Close scrutiny of the testimony discloses

90 that none of defendant's witnesses testified that he actually saw in the ground a union or merger of the veins, save Finch, who by reason of special observation was evidently put forward for the specific purpose, and in every instance, and they are but three or four, that Finch testified to a "definite junction" of the veins, or where "seen to unite," he not only did not describe the manner of the union, save in one instance that it was not along gouge, but in a "mass of ore," but he placed it in undeveloped territory or in the "horse-tail" structure and north of the Rainbow hanging wall; and he so pointed it out and measured distances on defendant's maps. Converging strike and dip are no more persuasive of union than of crossing of veins. In these premises, veins are shown to cross as often if not oftener than they unite. It is a circumstance to be noted that in testimony and argument it is insisted

in defendant's behalf that its maps are evidence, intended to speak for themselves, and to illustrate faults, ore, and ore structure in the veins. This may be allowed in so far as they conform to proven facts are not self-serving. And looking to these maps, they show the Jersey Blue ore structure at an angle to and not merging in the Rainbow structure, and abutting against faults or gouge and not against Rainbow ore. But this is largely theory. It is surprising, in view of what is involved, that so little development has been done at the points of first contact between these veins and where union or nonunion or crossing ought to be more open to determination than elsewhere. It is realized development is expensive. The ground is heavy and difficult to hold. Each party did some develop-
91 ment work for the other. Their workings unite at many points. But in instances both parties halted development at seeming vital points, as though fearful of results damaging to their theories. To briefly review this development, it is largely post-litigation. In all the years subsequent to location of the Blackrock and until this litigation threatened, no workings from the discovery shaft were on the Jersey Blue. This shaft is in the easterly Rainbow strand about one hundred feet from where the Rainbow branches. But on the tunnel level, fifty feet below the surface and four hundred feet west of the discovery shaft, was the face of a drift on the Jersey Blue, and on the 400 level was a drift through the country for twelve hundred feet west of the shaft, from which three or four crosscuts were run to the Jersey Blue. After this litigation threatened, defendant ran two parallel drifts, with crosscuts, from the drift face aforesaid, easterly to the discovery shaft. For the first one hundred feet, one drift is on a clay slip, the other on the vein. There the vein ended. Defendant's witnesses testified it was cut off by the Deadwood, and as the Deadwood is admitted a "Blue" vein, urge this as proof that the Jersey Blue is of older age than the Deadwood and so not a "Blue" vein. For the next one hundred and fifty feet and to the Rainbow, defendant's witnesses testified the workings are in highly mineralized and altered granite, filled with what Finch described as criss-cross quartz seams or stockwork, and Emmons as a sheeted zone of closely-spaced parallel quartz seams, with
92 some cross quartz seams, and which is claimed by them to unite the Jersey Blue, so continued with the broad side of the Rainbow. They placed the limits of this stockwork or sheeted zone continuation of the Jersey Blue at walls twenty feet apart and in undeveloped country. Beyond the Rainbow, there twenty-four feet wide, some of them testified that the Jersey Blue likewise continued to the discovery shaft and beyond and across the Blackrock east end line. On suggestion that they were virtually describing the Jersey Blue as crossing the Rainbow, they explained both veins merged into each other or in a hub of mineralization around the discovery shaft, and as one vein branched in four directions. Defendant's sampler testified that, as these workings were run, he sampled all vein matter and quartz disclosed; that from where the Jersey Blue ended one hundred feet from the old drift face in the new drift, he went east thirty-six feet for the next sample, then east fifty-three feet

for the next, then east eighty-three feet for the next, which was in the Rainbow; that in the parallel drift from opposite the point aforesaid he went east twenty-two feet for the next sample, then east sixty feet for the next, then east twenty-two feet, then twenty feet, then twenty feet for the next in the Rainbow. Westward in old workings where the vein is unquestioned, he sampled at ten feet intervals. Plaintiff's witnesses testified that the Jersey Blue ended and was not cut off by the Deadwood; that from there to the Rainbow is only unaltered granite, with no stockwork or sheeted zone and no
93 quartz seams, save the insignificant ones and joint seams in the granite of the district everywhere; that from near the old drift face the main part of the Jersey Blue coursed southeasterly, along which a drift was run until it reached and was cut off by the Blackrock fault along the north side of the Rainbow; that the drift was continued through and to the south side of the Rainbow and the Jersey Blue there found and drifted upon for one hundred feet. No segment of the Jersey Blue was found in the Rainbow where the drift crosscut it, and this, plaintiff's witnesses explained, is due to the fact that there the Rainbow is between two branches of the fault; that they did not think to develop to find it, though movement had so crushed the Rainbow it probably would not be found. Defendant's witnesses testify that what in plaintiff's behalf is there described as the Jersey Blue is only a fault gouge, transverse to Jersey Blue structure, and having in it some irregular bunches of quartz.

On the Blackrock 400 level, the Jersey Blue is not developed to the north side of the Rainbow, but from a crosscut entirely through both claims plaintiff drifted west one hundred feet to the Rainbow upon what its witnesses claimed is the Jersey Blue, consisting of parallel gouges and quartz two feet wide, faulting the Rainbow and ending within the latter against the Blackrock fault. Defendant's witnesses describe this as nothing but a branch of the Blackrock fault, and not the Jersey Blue. On the Blackrock 700 level, conditions and testimony are alike to that in relation to the level
94 last mentioned, save that the Rainbow is plainly more faulted by what plaintiff's witnesses describe as the Jersey Blue on the south side of the Rainbow; and upon this is a raise to the Elm Orlu 800 level, forty feet above. On the said 800 level, the Jersey Blue is developed on the north side of the Rainbow, and plaintiff's witnesses testified it curves northeasterly for a distance along the Blackrock fault, there the Rainbow north wall; that on the south side of the Rainbow it appears in a short easterly drift upon it. Some of defendant's witnesses testified that in the drift upon the north of the Rainbow the Jersey Blue does not reach the fault, but departs from the south side of the drift and the veins "have to unite" in "undeveloped territory," though Emmons testified it did proceed along the fault as stated by plaintiff's witnesses. Here, the fault has four branches in the Rainbow, and Emmons testified that, because of probable diverse movement between and along them, the Jersey Blue south of the Rainbow, if it crossed, might be looked for within two hundred feet either way.

On the Blackrock 900 level, Greene testified that on the south side

of the Rainbow the latter is cut off by the Jersey Blue, and he is unable to say why the western segment of the Rainbow does not reappear in workings farther west, unless faulted beyond them. There are no workings on the Jersey Blue immediately north of the Rainbow, and no other witness refers to this place. On the
95 Blackrock 1,000 level, Greene and Irving testified that on the south side of the Rainbow, the latter's ore body is cut off by the Jersey Blue, and that the Rainbow's western segment is not observable. The working in which this is said to be seen crosses through to the north side of the Rainbow and then along the Jersey Blue on the said north side. Greene further testified that the Jersey Blue there north of the Rainbow is but eight to ten inches wide, and on the south side it is four feet wide. No other witness referred to this place, save Finch, who testified that in the working north of the Rainbow is a positive, actual junction developed between the two veins, but the point he refers to is in what defendant's map depicts as "horse-tail" structure from the Jersey Blue and north of the Blackrock fault, which is along the hanging wall of the Rainbow. In reference to the Blackrock 1,100 and 1,200 levels, Searls testified that in stopes below the 1,100 and across the Rainbow he saw the Jersey Blue cutting and "terminating absolutely" the bands of zinc ore of the Rainbow, "just as distinct in the stope as it is here on this paper" (an illustrative sketch), and that it was unquestionably the Jersey Blue, because also visible in a drift four feet below. Greene testified that the stopes at the 1,100 on the south side of the Rainbow end against a northwest fault he believes to be the Jersey Blue; that he could not say how wide the Jersey Blue is there, as it was lagged, but in the stope it was three or four feet wide; that on the 1,200 on the north side of the Rainbow the Jersey Blue faults the
96 Rainbow, and that on the south side of the Rainbow for eighty feet it cut off the big stopes in the Rainbow ore body. No other witness refers to these places, save Finch, who testified that on the 1,200 in the crosscut a little farther west and on the north side of the Rainbow is a "definite junction of the two veins developed," though, he says, undoubtedly they also join farther west at this elevation; that the junction is not along gouge, but in the midst of a mass of ore. And there again he pointed out on defendant's map in "horse-tail" structure from the Jersey Blue and north of the Rainbow hanging wall. In reference to the Blackrock 1,300 level, plaintiff's map depicted the Jersey Blue within the Rainbow and crossing it at an acute angle, for four hundred feet. Plaintiff's witnesses testified to its existence there in the stopes. Some twenty feet north of where so located on the map, unknown to them, defendant had raised to the Blackrock 1,200, from whence the raise formerly had been carried to the surface. This fact developed while plaintiff's case in chief was in progress. In defendant's case in chief, its witnesses testified that the Jersey Blue and Rainbow veins are to be seen in the bottom of that raise; that on the level the lagging had been removed from the raise to the south side of the Rainbow; that the exposure across was solid zinc ore, without transverse fissures or

gouge, and for thirty-five feet. Finch testified that in the raise and twenty-five feet above the sill of the 1,300 level, the Jersey Blue and Rainbow "are seen to be united," but as it conclusively appears that the veins are converging at the first floor of the raise, he
97 again places the union in "horse-tail-" structure, if anything, and north of the hanging wall of the Rainbow. Salisbury testified he was in the raise and the veins "should come together about at the sill floor," which was "not now open to observation;" that in the stopes east of the raise "there is well exposed the so-called crossing of the Jersey Blue vein of the plaintiff in the midst of the so-called Rainbow lode of the plaintiffs;" that "the crossing is not very evident, but the thing which seems as I interpret it to be the Jersey Blue vein of the plaintiffs * * * is, as I interpret it, a slip through the ore of" the Rainbow; that "the slip is distinct;" that in reference to the structure of the ore following the slip he did "not so interpret it;" that at the Rainbow north wall the structure parallels it for three or four feet very distinctly, but further south ceases to be banded, and he would speak of it as having the structure of the granite it had displaced, and it is that structure which is the so-called Jersey Blue crossing; that the slip has gouge, with walls perfectly well defined, and "if you stand at just the right place," there seems, so far as the walls of the gouge "are concerned, a structure of ore running in that direction, but I could make out" that there was other structure "than that which seems to be outlined by the two walls of the gouge;" that on the south "that structure does not seem to me to obtain;" and that the so-called Jersey Blue had a strike more nearly east than on plaintiff's map and seemed to be merely a fault—slip made after the ore was formed. Burch testified that on the level he could not find the Jersey Blue where
98 plaintiff's map placed it; that from the raise south where the timbers were removed for the width of thirty feet of the Rainbow, is almost solid zinc ore, without gouges, or slips, or transverse structure; that looking up at the foot of the raise he could not tell how the structure of the zinc ore dipped; that it is not appreciably banded, but is irregular blocks, appearing more like the original granite structure; that he did not see anything that looked like "the ore coming down and being faulted;" that looking at the ore and rocks just southerly of the foot of the raise it is not evident that the bands of the Rainbow vein coming down are faulted by a southerly-dipping fault—nothing that he "could possibly interpret in that line." Wiley testified that in the raise the veins united and below are one—"come down and join as in that model can be seen:" that east of the raise in the stope and in the Rainbow are "two little mud slips," ten feet apart, striking north eighty-five degrees west, and dipping south seventy-five degrees; that one is a "very distinct gouge or mud slip" and without banding parallel to it, "except as you may have banding in the Rainbow lode itself;" that from the raise south across the Rainbow is "no plain diagonal structure of any kind cutting through there;" that there is hardly a stope in the

mine where you can not see these little gouges in the ore and along them the ore breaks, requiring extra timbering.

Two days before the testimony concluded, plaintiff's witnesses visited the raise at that 1,300 level, and, after defendant rested,
99 Green testified that in the west side of the raise at the first floor is a well-defined vein, with two wall gouges separated five feet, and in which next the south wall are six or eight inches of quartz, practically vertical, and next the north wall is about the same amount of quartz and zinc ore, between them being altered granite, containing little seams of quartz and zinc; that immediately south of this vein is rich zinc ore banding, approaching and abutting against it at a dip of north 53 degrees; that the north wall gouge (referred to as the Jersey Blue) appears east of the raise and diagonally crossing the drift at the first floor, still dipping steeply; that along the north side of that drift and the stope farther east is a strong gouge wall, dipping north 80 degrees to apparently normal Rainbow dip of north 64 degrees; that south of this wall is very solid zinc ore, and six sets south is a gouge, having along it eight inches of quartz, with some pyrite and a little zinc in it, striking north 73 degrees west and dipping south 79 degrees; that it goes up to and across the back of the stope and "could be followed as you would follow one of these pilasters" of the court-room, disappearing in the stoping; that south of that gouge is the solid zinc ore of the Rainbow. On cross-examination, he sought to explain his former testimony and the map, and testified that in his opinion the Jersey Blue in five branches crosses the Rainbow on that level. He also testified to gouges in the Rainbow and due to internal movement. Irving testified that in the west side of the raise at the first floor he
100 saw and entered in his notes "ten to eighteen inches of quartz, with some gouge cutting the Rainbow banding;" that the Rainbow banding seemed to come in on the south side of the raise and toward the vein described; that the vein last aforesaid dipped practically vertical and is of strike probably more west than north seventy degrees west; that it is the Jersey Blue, or a strand of it; that east of the raise in the stope he saw that vein in the Rainbow, and he described it about as did Greene, his notes reading, "nearly vertical, very strong wall opening Rainbow material, good gouge, north 80 degrees west;" that in the west end of the stope and in the roof he saw, as he read from his notes, "beautiful vein, unmistakably Jersey Blue, about six or eight inches good vertical zinc in it," which he considered the Jersey Blue, or a strand of it. On cross-examination, he testified he could not see the bottom of the raise; that he thinks there are two strands of the Jersey Blue at that level, one in the raise and one in the stope, probably overlapping, and that there may be more; that the strike of the strand in the stope is north 80 to 85 degrees west, and the dip is south 73 degrees; that in the stope he did not observe Rainbow banding—"very definitely to decide whether it was cutting across the banding or not," but the Jersey Blue dips in the opposite direction to the usual dip of the ore; that at an acute angle it cuts across the Rainbow banding that is a little

farther north and dipping north; that the Jersey Blue there forms "a vein which shows in the roof beautifully," about twelve
101 inches wide; that north of the Jersey Blue in the raise is ore which may be part of the Jersey Blue; that if the two strands of the Jersey Blue continue on strike till opposite each other they will be eighteen feet apart, though the one in the raise likely "peters out" and an overlapping strand continues the Jersey Blue. Searls testified that in the raise the Rainbow plain banded structure dips north 55 degrees, and across and cutting and breaking it down is a plain south wall of at least that portion of the Jersey Blue, nothing obscure nor hard to see, dipping vertically; that the polishing and slickensiding of the previously existing ore with striations to the east at an angle of 15 degrees to the strike are plainly observable on the Jersey Blue south wall, which strikes north 77 degrees west; that the wall is a thin gouge and next to and plainly across the severed strands of ore are ten inches of parallel quartz, lying right against the north dipping structure of the Rainbow; that — the Jersey Blue the width of the raise to the north is vertical structure, zinc and quartz banded, absolutely vertical; that in the drift east from the raise the Jersey Blue can be seen in a corner at least six feet wide, diverging to the south, with a strike north 60 to 65 degrees west; that the angle between the hanging walls of the veins, 30 degrees, can be seen very clearly defined in the roof of the drift, and that it is perfectly obvious that the Jersey Blue departs southeast from the drift; that where these two hanging wall gouges are together it is impossible to see one gouge cut through the other and they are apparently merged for six feet on strike, though the intersection on dip is plain,
102 as in the raise can be seen the Jersey Blue gouge of vertical dip; that the Jersey Blue south wall cutting across the Rainbow in the raise and its north wall cutting across the Rainbow in the drift, are "just as plain as that same wall of the courtroom;" that in the level and stopes the Jersey Blue structure does not all persist, but is uninterrupted strands, which is common where veins cross from one variety of country rock to another, the Rainbow here being of the nature of country rock to the Jersey Blue; that four floors below the level he can see the Jersey Blue with a strong blue gouge and parallel zinc banding cutting the Rainbow wall and traversing it diagonally, the same Jersey Blue he saw in the workings at the level. On cross-examination, he testified that from the raise he saw no strand that died out; that ten feet up in the roof of the stope where Irving saw the beautiful vein he saw some white material, which he thought is quartz, though he did not try to inspect it closer; that in Rainbow stopes are almost innumerable small cracks like one on the 1,300 level he thought might have occurred at the time the Jersey Blue faulted the Rainbow.

Winchell testified that a pile of muck concealed the level below the raise, but at the first floor he saw the Rainbow solid mass of zinc ore dipping flatly north 50 to 60 degrees; that the Jersey Blue there dips southerly or nearly vertical, "going directly across the banded structure of the Rainbow." He then describes it in the drift east

from the raise and in the stope approximately as did Searls.
103 He further testified that veins will split when they encounter harder material, and the fissures in the latter will "heal" and leave little evidence of crossing; that this has happened where the Jersey Blue crosses the Rainbow; that on the 1,300 level the Jersey Blue crosses the Rainbow at an acute angle and is split into stringers; that the like occurs on the Blackrock 1,400 level, and he correlates the strands in these two levels. He was not cross-examined. Weed testified he agreed generally with Greene, Irving and Searls in reference to the situation in the raise and stopes on that level.

In rebuttal, Finch testified that in a new westerly drift from the stope on the 1,300, a strand described as that of the Jersey Blue by plaintiff's witnesses, is a mud seam or gouge, taking a strike of south 73 degrees west. Burch testified that "mud seam" dwindled to a crack, as did Wiley.

The judge twice visited this raise at the level, but conditions were such at the last visit that it added nothing to judgment. On the Blackrock 1,400 level and stopes above it, all below the point of alleged union, Greene testified that in stopes and crosscuts the Jersey Blue could be seen in the Rainbow. Irving testified that in a stope four floors above the level the Jersey Blue is found cutting the Rainbow. Searls testified that on the ninth floor above the level the appearance is of another vein coming in the stope; that the banded zinc ore of the Rainbow striking slightly northeast comes up against and is terminated by a distinct vertical gouge, the zinc ore
104 being drag-d around slightly and crushed into breccia; that "this structure" strikes north 70 degrees west, dips vertical and is traceable across the stope to the end of that floor; that the conclusion is irresistible; that the Rainbow is there broken and cut off by a later vein. He further testified veins often cross without faulting. Winchell testified on this level the Rainbow is faulted along its south side, in the stopes, by the Jersey Blue; that the Jersey Blue is about eight feet wide in a crosscut there south of the Rainbow. Finch testified that on this level, to his knowledge, no vein crosses the Rainbow as depicted on plaintiff's map, though there are some fault slips. Burch testified to transverse seams of gouge there, but so far as he could see or find for lagging there is only the Rainbow. So likewise, Wiley.

The Elm Orlu 1,500 level is forty feet above the Blackrock 1,400 level, and from the former a crosscut was run into the Blackrock. Greene testified that therein the Jersey Blue is found cutting through the Rainbow and that the veins showed different structure. Irving testified that there at one point the Jersey Blue is wholly in the Rainbow; that the latter dips north 45 to 50 degrees and the former dips 87 degrees—nearly vertical; that the Jersey Blue banding goes directly through the Rainbow banding and it is a vein made up of pink manganese—"the clearest case" of crossing he knows of. Finch testified that what the plaintiff's witnesses call the Jersey Blue on this level, is nothing but fault gauges, as does Wiley. Neither specifically refers to the pink manganese mentioned by Irving.

105 On the Elm Orlu 1,700 level, a northeast crosscut from the Elm Orlu shaft to near the Blackrock west end line is claimed by plaintiff's witnesses to have cut near its face the Jersey Blue entirely through the Rainbow and south of it. Some development was done by drift and raise. Defendant's witnesses are of contrary opinion. This crosscut, 600 feet long and in progress during the trial, cuts more than eight veins and five slips, of varying sizes, strikes and dips.

In reference to the Creden vein, defendant's witnesses testified it united the Rainbow and Jersey Blue, and plaintiff's witnesses that it diverges from the Rainbow and is cut off by the Jersey Blue. So far as appears, it is a strand of the Rainbow, diverges from the latter's north side in the Elm Orlu at depths of 1,000 to 1,200 feet, extends no farther east than crosscut 1,218 on the 1,200 level and the Blackrock west end line on the 1,300 level, strikes northwesterly under both claims and unites with or is cut off by the Jersey Blue. It is not proven to unite with the Jersey Blue. Its apex is probably in both claims. Neither party seems much interested in it, and it is of little importance in itself, though careful investigation might have furnished light upon this issue.

Taking into consideration all the evidence, the inspection, and the undefinable impressions received during the trial, the court is not persuaded that by a preponderance of the evidence it is proven that the Jersey Blue vein and the Rainbow vein unite. Consequently, the finding must be and is that they do not unite.

106 At the tunnel level the Jersey Blue ends 150 *feet* west of the Rainbow. The stockwork claimed to continue it; even if there, has neither strike nor limits. It answers no definition of a vein. Apparently here is one place where Finch found it necessary to some indefinite extent to characterize as vein what in his judgment is not vein. The sampler's conduct during the progress of the work speaks loudly. He found no vein matter or quartz for fifty-three feet in one drift and for sixty feet opposite in the parallel drift, when the ground was fresh and no timbering to obstruct his view. Plaintiff's evidence that here is only country rock permeated with the joint and quartz seams common throughout the district is persuasive and superior in weight to that of the defendant. Defendant's contention that the Jersey Blue is faulted by the Deadwood is not supported by the evidence. Some small slips are probably at or near the termination of the Jersey Blue, but to correlate them with the Deadwood requires a series of sweeping curves and projections unwarranted by any development upon the Deadwood there or below, and impossible in these premises. On the Elm Orlu 800 level, where union is next claimed, the Blackrock fault separates the veins, and by Finch the union is placed in the slightly mineralized country in undeveloped territory between veins. The other points of developed union claimed are on the Blackrock 1,000, 1,200 and 1,300 levels, and in every instance by Finch, who alone purports to have perhaps seen them, are placed in the mineralized country between the veins.

107 This is not union within the meaning of the statute. The veins have not merged and lost their identity in the mineral-

ized country between them, even if it is sufficiently mineralized to be classed as ore. Both veins are there distinct and within clearly defined walls. The mineralized country is not part of either vein, and, if ore, is, as Emmons testified, ore between the veins. The conditions at the Blackrock 1,300 level and the testimony in relation to them are somewhat surprising. It is remarkable that defendant's witnesses said so little, not only in chief, but in rebuttal, of the appearance of the veins at the first floor of the raise and in the walls of the stope. They, too, returned and reviewed the place about the time that plaintiff's witnesses first viewed it. Finch testified that in the raise and twenty-five feet above the level the veins "are seen to be united," and his colleagues testified they should come together at or below the level. Finch previously testified the Jersey Blue branches wherever it approaches the Rainbow, so whatever he saw might have been a branch of the Jersey Blue departing from the raise and which might be one of the strands plaintiff's witnesses testified are in the workings below. Not only did defendant not lower the raise to disclose the actual point of contact of the veins and their relation there, but the floor of the level and the west wall of the raise were obscured, so that none of even its own witnesses saw either. It is apparent that a very limited additional development or even clearing away obstructions might have furnished evi-
108 dence to fully determine the issue. This appears to be the most favorable point of approach of the veins to determine the issue. In so far as the crossing of the veins is concerned, the evidence equally fails to persuade that they do. It is true that conditions and appearances in the raise of the Blackrock 1,300 level tend to support the interpretation of plaintiff's witnesses, but not to the extent claimed by them. It is also true some of the plaintiff's witnesses testified definitely to and described crossings of the veins at points whereon defendant is wholly silent. And this is significant in this; it is obvious and also admitted that if the veins cross at any one point they must cross at all points, even though so obscurely as to be undiscoverable. But this is not so of union. Every appearance of union and merger may exist at many places, but if one point of crossing is proven, all evidence of union avails nothing and the veins are proven to cross throughout. Healing and cementation may destroy evidence of crossing in many places. Where the "Blue" fractures crossed the well mineralized east-west veins, in most places there was nothing to replace and the fractures healed. Only where there was yet unreplaced granite would there be much evidence of cross vein structure.

At the same time, there are so many slips and gouges in the Rainbow, as well as out of it, so much transverse structure in the Rainbow, and so much obstruction to the view, that it is easy for the expert to be deceived or to deceive himself and to misinterpret geological phenomena there. "If you stand at just the right
109 place," as Salisbury puts it, may, to some extent, be taken figuratively as well as literally. The Blackrock faults have so complicated a situation that it is doubtful if the problem is capable of solution. Whether they united or crossed, the movement along

the Blackrock fault strands appears to have cut off and shifted the point of convergence of the veins at many if not all places; and the original point may be undiscoverable, the continuity of the Jersey Blue destroyed. Emmons believes the throw of these faults may have been in several directions and for as much as two hundred feet either way. The Deadwood may indicate less throw. In these premises where veins cross as often or oftener than they unite, converging strike and dip are not presumptive of union. It is admitted "Blue" veins cross obscurely; that the Deadwood does so. This latter crossing has been stoped by the defendant in connection with the Rainbow, but beyond the testimony that the crossing is obscure, there is little in evidence by way of comparison with the Jersey Blue at union or crossing and south of the Rainbow.

In view of all the circumstances and that reasonable and learned men may honestly differ in their interpretation of geological phenomena in these premises, the court is constrained to say the evidence is in equipoise; and so the determination is dictated by the burden of proof. Even as defendant fails to prove the veins unite, so would plaintiff fail to prove they cross, if the burden of proof was upon it. A principle of law, however, demands that the court shall find that the veins do cross. Defendant alleges they unite, and
110 claims an estate by reason of it. Plaintiff denies they unite, and alleges they cross and admits a different estate in defendant by reason of it. Though defendant fails to prove the union and the estate it claims, the law is it must be awarded the estate that plaintiff admits or concedes to it. And accordingly the finding is that the veins cross, and, save at the intersection, defendant is entitled to all ore bodies in the Jersey Blue south of the Rainbow and wherever it goes or where plaintiff admits it goes, if not otherwise found. The Rainbow strand easterly from the Blackrock discovery shaft extends about 400 feet east and to within two hundred and fifty feet of the Blackrock east end line, where it is cut off by a northwest fault. Even at the discovery shaft, it is east of any extralateral rights of plaintiff. No discovery shaft was required when the Blackrock was located. Both the Jersey Blue and the Rainbow were discovered when the location was made, or at least before the patent entry. Evidently, the cropping of the two veins gave the appearance of one continuous east-west vein, and the location was made accordingly. Neither the Jersey Blue nor the Rainbow is a secondary vein. Both are primary. The Jersey Blue overlaps the Rainbow. Extralateral rights based on it extend east beyond where the like rights based on the Rainbow begin. Indeed, taking the course of the Jersey Blue where fixed by plaintiff south of the Rainbow, it is probable it crosses the Blackrock south side line east of the Elm Orlu east end line. That the Rainbow crosses both side
111 lines is not controlling. There can be but one set of end lines, and if the located end lines fix extralateral rights upon one vein, as they do upon the Jersey Blue, they fix them upon all veins.

Although it is immaterial whether or not the easterly strand crosses the Blackrock east end line, it is observed that where it is cut

off by the northwest fault, old stopes show it about twenty feet wide. From the fault to the east end line the facts are much the same as from the Jersey Blue termination west of the discovery shaft and to the Rainbow on the tunnel level. This is another place where it would seem that Finch characterizes as vein what in his judgment is not vein and to an indefinite extent. For defendant, it is claimed conjugated quartz seams, stockwork, east of the fault and 250 feet to and across the east end line, are the continuation of the easterly strand of the Rainbow. Plaintiff contends the easterly strand has been cut off by a northwest fault, and that east of the fault is but country, with some quartz seams parallel to the fault and some joint and other quartz filled seams common to the country. Nothing appears here for the distance of 250 feet to satisfy the definition of a vein. Again, there is no strike or boundaries, save for some individual northwest quartz seams. This stockwork, if it exists, does not measure up to Salisbury's illustration of interior stockwork on strike connecting two separate segments of a vein. Here the stockwork is claimed to extend 250 feet from the segment of the
112 vein to the west, but no connected segment to the east appears.

It is probable that the eastern segment of the easterly strand was faulted to the north and may appear in a trench north of the Blackrock north side line. And this may be the apex of the great ore bodies at depth in the easterly part of the Blackrock. Considering the evidence in connection with the patent presumption, it does not persuade that the easterly strand crosses the east end line.

In the matter of the estoppel by deed claimed by defendant, in August, 1906, plaintiff executed to defendant's predecessor in interest an option to purchase "all of the right, title and interest of plaintiff" in and to the Blackrock quartz lode mining claim—being an undivided one-quarter thereof." This was recorded October 31, 1906. October 26, 1906, plaintiff's directors adopted a resolution of sale to the optionee and authorizing its officers to execute to him a deed of "an undivided one-quarter interest in and to that certain quartz lode mining claim known as the Blackrock quartz lode mining claim * * * it being the sense of the board of directors that said company shall convey * * * all of the right, title and interest" it has "in and to the above described property."

This was recorded May 1, 1907. October 29, 1906, plaintiff executed to the optionee a deed, reading that plaintiff "does remise, release and forever quit claim unto the said party of the second part, and to his successors forever, all the right, title, interest, claim and demand of the party of the first part in and to that cer-
113 tain portion, claim and mining right, title and property on those certain ledges, veins, lodes or deposits of quartz and other rock in place, containing precious metals of gold, silver and other metals, * * * the following described mining property, to-wit: An undivided one-quarter interest in and to that certain quartz lode mining claim known as the 'Blackrock' quartz lode mining claim. * * * It being the intention of the party of the first part to convey to the party of the second part all its right, title and

interest in and to the above described property. Together with all the dips, spurs and angles and also all the metals, ores, gold, silver and metal-bearing quartz, rock and earth therein, and all the rights, privileges and franchises thereunto incident, appendant and appurtenant, or therewith usually had and enjoyed; and, also, all the estate, right, title, interest, possession, claim and demand whatsoever of the said party of the first part of, in or to the said premises and every part or parcel thereof."

November 1, 1906, the optionee and grantee in said deed conveyed all received by virtue of it to others, who in turn conveyed to defendant. Defendant's contention is that in any event by this deed plaintiff conveyed one-quarter of any ore bodies beneath the Blackrock that apexes in the Elm Orlu, and also the like portion of any ore bodies beneath the Elm Orlu that apex in the Blackrock and which otherwise might belong to plaintiff. To maintain this contention, defendant appeals to Montana Mining Co. vs. St. Louis Min-
114 ing Co., 204 U. S. 204. But that case is distinguishable from this. There, the deed was to settle litigation, and was of a portion of the St. Louis claim, "together with all the minerals therein contained."

A vein apexing in said claim dipped under the deeded portion. And the court held that the segment of the vein under the deeded portion was "therein contained," and so was conveyed by the deed. Although the court rested the decision somewhat on the rule of common law, it seems clear that in any view the segment of the vein was in the deeded portion—was "therein contained"—and within the intent of the deed. A vein apexing in a claim is in every part of that claim under which it dips. But in the case at bar there was no litigation to settle. Veins apexing in the Elm Orlu and to which that claim possessed extralateral rights were not in the Blackrock, though they dipped under its surface. Nor were they carved out of the Blackrock, for never were they in it. The property conveyed by the Elm Orlu patent was not a rectangular block to the center of the earth, but was such block with all projecting veins, ape ing therein, wherever they extended; and those projecting veins were as distinct and separate from the surface beyond the Elm Orlu under which they dipped as like surface projections nearly surrounded by adjacent property would be from it; and no more in it in the former case than in the latter. Clearly, a deed of land and all therein would not convey land projecting in and nearly surrounded by it.
115 Suppose this deed was of warranty; would plaintiff be liable when the owners of other veins dipping under the Blackrock, of which there are doubtless some, assert their right thereto? Are those veins in the Blackrock? And, if not, why are these of the Elm Orlu? The option was to convey the Blackrock only, not any part of the Elm Orlu. There is nothing to show that the optionee had any knowledge plaintiff owned the Elm Orlu. The circumstances and the language of the deed warrant the construction that only the Blackrock and its extralateral rights were within the intent of the parties. Giving effect to every one of the profuse words in the deed, this seems the right conclusion. The same is true of such portions

of veins apexing in the Blackrock and dipping under the Elm Orlu. If the facts are such that by virtue of location and patent, not the Blackrock's extralateral rights, but the Elm Orlu's attached thereto, those portions were not in the Blackrock, but were in the Elm Orlu from the beginning. The claim of estoppel fails.

It appears that each party has mined ore that is the property of the other, and accounting will be had. From the findings, the conclusions and the decree are clear. Plaintiff is owner of and entitled to all ore bodies in dispute (1) in the Rainbow vein throughout depth between the Elm Orlu west end line and a parallel line projected from the Rainbow south wall apex crossing of the common side line,
(2) in the Creden vein so far as its apex is within the Elm Orlu
116 and between end lines there projected, (3) in the Pyle strand
in so far as its apex is within the Elm Orlu and between end lines there projected. Defendant is owner of and entitled to all ore bodies in dispute (1) in the Rainbow vein throughout depth east of where the Rainbow south wall apex crosses the common side line and the Elm Orlu end line there projected, (2) in the Creden vein in so far as its apex is within the Blackrock and not within Elm Orlu end lines projected where the Creden vein apex departs from the Elm Orlu, (3) in the Pyle strand in so far as its apex is within the Blackrock and east of the Elm Orlu end line or the end line projected where the Pyle apex crosses the common side line, (4) in the Jersey Blue vein throughout depth, save where it crosses the Rainbow vein between the Elm Orlu west end line and the end line projected at the Rainbow south wall apex crossing of the common side line. Each party will pay its own costs.

A great chancellor once said that the test of a good decree was that it satisfied neither party. If that quality attaches to this decision, some consolation ought to be found in the reflection, not of influence in the decision, however, that each party is awarded everything and deprived of nothing that, apparently, it thought itself entitled to until recently.

BOURQUIN, *J.*

117 In the District Court of the United States for the District of Montana.

In Equity.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Stipulation.

It is hereby stipulated and agreed by and between the parties hereto that in the preparation of the record upon appeal, if an appeal

is taken in the above styled case, the full testimony of the witnesses in question and answer form shall be embodied in said record on appeal instead of a narrated statement of all the testimony, or a portion thereof, and that in the preparation of a statement herein the full record of the testimony in question and answer form may be embodied in said statement in lieu of narrated testimony. This stipulation is made in the light of the technical features of the case and in the light of the various questions arising from
118 the testimony and this stipulation is further made subject to the consent of the judge of the above entitled court.

Dated this 17th day of May, 1916.

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Filed Dec. 29, 1916. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy Clerk.

119 In the District Court of the United States for the District of Montana.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Stipulation.

It is hereby stipulated and agreed by and between the parties hereto that the annexed statement of the evidence may, by the court, be settled, allowed and approved as correct.

Dated this 28th day of December, 1916.

JOHN P. GRAY,
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120 Filed Dec. 28, 1916. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy Clerk.

In the District Court of the United States for the District of Montana.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Stipulation.

It is hereby stipulated and agreed by and between the parties hereto that all of the exhibits in said case may in their original form be considered a part of the statement of the evidence and the proceed-

ings of the Court to be settled by the Judge of the above entitled court and that all of the said exhibits of whatsoever kind and character may in their original form be certified by the clerk of the above entitled court to the clerk of the Circuit Court of Appeals of the United States, for the Ninth Circuit, as a part of the record on appeal in the above styled action, said exhibits to be considered by the Cir-
121 cuit Court of Appeals, for the Ninth Circuit, aforesaid, in the consideration of the appeal in the above styled action.

Dated this 23rd day of December, 1916.

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Filed Dec. 28, 1916. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy Clerk.

122 In the District Court of the United States for the District of Montana.

In Equity.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Stipulation.

It is hereby stipulated and agreed by and between the parties to the above entitled action through their respective counsel that the defendant may have to and including the 11th day of September,

1914, in which to file its answer or such other pleading to plaintiff's bill of complaint as it may desire in the above styled cause.

Dated this 4th day of August, 1914.

MYRON A. FOLSOM,
J. L. TEMPLEMAN,
JOHN P. GRAY,
Solicitors and Counsel for Plaintiffs.
J. BRUCE KREMER,
ALF C. KREMER,
L. P. SANDERS,
Solicitors and Counsel for Defendant.

123 Filed Aug. 11, 1914. Geo. W. Sproule, Clerk.

In the District Court of the United States for the District of Montana.

In Equity.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Stipulation.

It is hereby stipulated and agreed, by and between the parties to the above-entitled suit, through their respective counsel, that the plaintiffs may have up to and including the 15th day of October, 1914, in which to file their reply or such other pleading to defendant's answer as the plaintiffs may desire in the above-entitled suit.

Dated this 5th day of October, 1914.

JOHN P. GRAY,
J. L. TEMPLEMAN,
GEORGE F. SHELTON,
MYRON A. FOLSOM,
Solicitors and Counsel for Plaintiffs.

124 W. H. DICKSON,
A. C. ELLIS, JR.,
RUSSELL G. SCHULDER,
J. BRUCE KREMER,
L. P. SANDERS,
ALF C. KREMER,
Solicitors and Counsel for Defendant.

Filed Oct. 6, 1914. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy Clerk.

In the District Court of the United States for the District of Montana.

In Equity.

No. 19.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Stipulation.

It is hereby stipulated and agreed, by and between the parties to the above entitled suit, through their respective counsel that the bill of complaint herein on file may be amended so as to allege
125 that the Clark-Montana Realty Company conveyed unto W. A. Clark, Jr., an undivided one-half interest in and to the Elm Orlu claim on August 18th, 1906; the said bill of complaint as it now appears on file alleging that the said conveyance was made on August 18th, 1907.

It is further agreed and understood, that the defendant's answer to the original complaint shall stand as an answer to the amended complaint and that the admissions and denials therein contained shall cover the said amendment.

Dated at Butte, Montana, this 30th day of November, 1914.

JOHN P. GRAY,
GEORGE F. SHELTON,
J. L. TEMPLEMAN,
M. F. FOLSOM,
Attorneys for Plaintiffs.
W. H. DICKSON,
J. BRUCE KREMER,
A. C. ELLIS, JR.,
L. P. SANDERS,
RUSSELL G. SCHULDER,
ALF C. KREMER,
Attorneys for Defendant.

Filed Nov. 30, 1914. Geo. W. Sproule, Clerk.

126 In the District Court of the United States for the District of Montana.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, a Corporation, Defendant.

Stipulation.

It is hereby stipulated and agreed by and between the parties hereto that the annexed stipulation is a true and correct copy of the stipulation heretofore entered into by the parties hereto and may be filed in the record of the testimony in the above styled cause at the conclusion of the testimony, as a part of the record in the above case, the original stipulation, which has been misplaced, having been duly signed by the attorneys for the parties herein.

Dated this 17th day of May, 1916.

JOHN P. GRAY,
J. L. TEMPLEMAN,
M. A. FOLSOM,
Attorneys for Plaintiffs.

127 W. H. DICKSON,
A. C. ELLIS,
RUSSELL G. SCHULDER,
WM. SCALLON,
J. BRUCE KREMER,
L. P. SANDERS,
ALF C. KREMER,
Attorneys for Defendant.

In the District Court of the United States for the District of Montana.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, a Corporation, Defendant.

Stipulation and Agreement Made at Butte, Montana, August 5, 1914.

Whereas, a controversy exists between the Clark-Montana Realty Company and the Elm Orlu Mining Company, owner and lessee respectively of the Elm Orlu lode mining claim, and the Butte and Superior Copper Company, Limited, the owner of adjoining mining claims, situated in Summit Valley Mining District, Silver Bow County, Montana; and

Whereas, the Clark-Montana Realty Company and Elm
128 Orlu Mining Company have commenced an action against the said Butte and Superior Copper Company, Limited, in the United States District Court, for the District of Montana; and

Whereas, said controversy will be submitted to the determination of some court; and

Whereas, the said controversy involves valuable ore bodies, and the parties desire, without the necessity of appealing to the court, to enter into a stipulation and agreement for ceasing extracting ore within certain territory, which agreement shall operate during said litigation and until judgment is entered;

Now, therefore, it is agreed as follows:

1. The Butte and Superior Copper Company, Limited, shall not mine or extract ore beneath the Black Rock, Elm Orlu, Jersey Blue, Admiral Dewey or Silver lode claims west of a vertical plane extended downward, parallel to the west end line of the Elm Orlu lode mining claim, and through a point 400 feet west from the Black Rock shaft, except that the said Butte and Superior Copper Company, Limited, may mine beneath the surface of the Black Rock mine above the 1,100 foot level of the said Black Rock mine.

2. The Elm Orlu Mining Company and the Clark-Montana Realty Company shall not mine or extract ore east of a vertical plane drawn downward through the westerly boundary line of the Black Rock lode, and said boundary line extended indefinitely in its own direction southerly, except that the said Elm Orlu Mining Company and the Clark- Montana Realty Company shall have the right
129 to mine above the 1,300 foot level of the Elm Orlu mine at any place beneath the surface of said Elm Orlu mine.

3. The Butte and Superior Copper Company, Limited, shall not at any place mine or extract ore beneath the surface of the mining property of the Clark-Montana Realty Company and the Elm Orlu Mining Company; nor shall the Clark-Montana Realty Company and the Elm Orlu Mining Company mine at any place beneath the surface of the mining claims owned by the Butte and Superior Copper Company, Limited.

4. It is expressly understood and agreed that this stipulation gives to each party the right to mine pending the litigation, ore bodies which the other party claims to be the owner of, and is made for economic reasons with a view of permitting each party to continue economic mining, and shall not be used or held to in any manner limit or define either the rights or the claimed rights of either party, nor as an admission by either party, it being understood that it is in the nature of a compromise agreement in lieu of an application for an injunction pendente lite. In arriving at the terms of this stipulation, and defining the territory which can and cannot be mined pending the litigation, consideration has been given to the question of economic mining and convenience rather than to the question of the rights of the parties hereto.

5. Each party agrees to keep accurate account of the ore mined

and record of the places where mined, and when requested
130 by the other, to furnish full statements concerning same.

6. It is further understood that neither party will mine so as to interfere with any development work made by or for the other parties to the litigation.

7. Parties hereto have heretofore had certain understandings and agreements with reference to the performance of work within the property of the other for the purposes of development and the disclosure of the geological conditions. It is agreed that the said agreements shall be carried forward under this stipulation.

CLARK-MONTANA REALTY COMPANY AND
ELM ORLU MINING COMPANY,

By ——— ———,
——— ———,
Its Attorneys.

BUTTE AND SUPERIOR COPPER COMPANY,
LIMITED,

By ——— ———,
——— ———,
Its Attorneys.

Filed May 17, 1916. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy.

131 In the District Court of the United States for the District of Montana.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Assignment of Errors.

Comes now the defendant, and files the following assignment of errors upon which it will rely upon the prosecution of its appeal from the decree made by this Honorable Court on the 6th day of July, 1916, in the above entitled court:

I.

The court erred in finding, holding and deciding that the Elm Orlu claim was located before the Black Rock claim was located.

II.

The court erred in finding, holding and deciding that the Pyle strand of the Rainbow vein diverges from the south side of the latter

vein in the Elm Orlu claim, and there and for some indefinite distance easterly has its apex in the Elm Orlu claim.

III.

The court erred in finding, holding and deciding that the
132 Jersey Blue vein crosses on strike or dip the Rainbow.

IV.

The court erred in finding, holding and deciding that the apex of the easterly strand of the Rainbow vein in the Black Rock claim did not cross the easterly end line of the Black Rock claim, but terminates at a point within said claim about 250 feet west of the Black Rock east end line.

V.

The court erred in finding, holding and deciding that prior to the Black Rock location and patent entry, both the Rainbow vein and the Jersey Blue vein at their apices were discovered and known within the Black Rock claim and at their apices appeared as a continuous east-west vein.

VI.

The court erred in finding, holding and deciding that the plaintiffs were entitled to parts of the ore bodies in controversy.

VII.

The court erred in finding, holding and deciding that the so-called Pyle strand, vein or lode had its top or apex or any part of its top, or apex within the surface boundaries extended downward vertically of the Elm Orlu claim.

VIII.

The court erred in finding, holding and deciding that the Elm Orlu claim, or location, was prior in right or in time to the
133 Black Rock claim, or location, or to the Jersey Blue claim, or location.

IX.

The court erred in not finding, holding and deciding that the Jersey Blue claim was prior in time and in right to the Elm Orlu.

X.

The Court erred in not finding, holding and deciding that the Black Rock claim, or location, was prior in time and in right to the Elm Orlu claim or location.

XI.

The court erred in finding, holding and deciding that the so-called Jersey Blue vein is a distinct vein from the so-called Black Rock or Rainbow vein and not a branch or portion thereof.

XII.

The court erred in finding, holding and deciding that the plaintiffs are entitled to any portion of the Creden vein.

XIII.

The court erred in finding, holding and deciding that the plaintiffs are entitled to any part of the Elm Orlu or Rainbow vein except that portion of said vein which lies between planes, one drawn vertically downward through the westerly end line of the Elm Orlu claim, and extended indefinitely in its own direction, and the other parallel thereto through a point on the northerly side line of the Elm Orlu claim 190 feet easterly of the southwest corner of the Black Rock claim and extended indefinitely in its own direc-
134 tion, to-wit: to the extent, and only to the extent, that the said Elm Orlu or Rainbow vein remains separate and distinct from, and unaffected by, the veins or ore bodies apexing in said Black Rock and Jersey Blue claims, beyond which all should have been decreed to the defendant.

XIV.

The court erred in finding, holding and deciding that the plaintiffs were entitled to any vein, lode or ledge, or any portion of any vein, lode or ledge, or to any ore body or portion of any ore body within the vertical boundaries of the Black Rock claim.

XV.

The court erred in finding, holding and deciding that the plaintiffs were entitled to any vein, lode or ledge, or any portion of any vein, lode or ledge, or to any ore body, or portion of any ore body, within the vertical lines of the Jersey Blue claim.

XVI.

The court erred in not finding, holding and deciding that the defendant was entitled to all of the ore bodies, veins and ledges within the vertical boundaries of the said Black Rock and Jersey Blue claims.

XVII.

The court erred in not finding, holding and deciding that the defendant was entitled to all those certain veins variously called the

Rainbow, Black Rock and Jersey Blue veins throughout the entire length of said vein or veins by whatever name called within the said Jersey Blue and Black Rock claim, and throughout their entire depths.

135 XVIII.

The court erred in making and entering its decree herein in favor of the plaintiffs.

XIX.

The court erred in not making a decree in favor of the defendant, except as to that portion of said Rainbow lode which lies between planes, one drawn vertically downward through the west end line of the Elm Orlu, the other drawn through a point 190 feet east of the southwest corner of the Black Rock, each plane being extended indefinitely in its own direction, to-wit: to the extent, and only to the extent, that the said Elm Orlu or Rainbow vein remains separate and distinct from, and unaffected by, the veins or ore bodies apexing in said Black Rock and Jersey Blue claims, beyond which all should have been decreed to the defendant.

XX.

The court erred in allowing the plaintiffs any money recovery, but in this connection the defendant states that if the plaintiffs were entitled to a recovery or to an accounting upon the basis of the decree made herein, then the amount found by the court would be correct upon the assumption above stated, but contests the right of the plaintiffs to any recovery at all. The defendant raises no question hereby as to the amount but as to the right to recover or to have an accounting at all.

XXI.

136 The court erred in failing to find that the plaintiffs were estopped to assert title to any vein in the Black Rock claim by reason of the deed made, executed and delivered by plaintiffs' predecessors in interest to the defendant, or its predecessors in interest.

XXII.

The court erred in failing to find that the plaintiffs were estopped to assert title to any portion of any vein in the Black Rock claim easterly of a plane parallel to the westerly end line of the Elm Orlu claim and drawn through a point on the northerly side line of the Elm Orlu claim 190 feet easterly of the southwest corner of the Black Rock claim, by reason of the deed made, executed and delivered by the plaintiffs' predecessors in interest to the defendant or its predecessors in interest.

XXIII.

The court erred in failing to find that the plaintiffs were estopped to assert title to any portion of any vein in the Black Rock claim easterly of a plane parallel to the westerly end line of the Elm Orlu claim and drawn through a point on the northerly side line of said claim 301 feet easterly of the southwest corner of said Black Rock claim, by reason of the deed made, executed and delivered by the plaintiffs' predecessors in interest to the defendant or its predecessors in interest.

XXIV.

The court erred in admitting in evidence the location notice of the Elm Orlu quartz lode mining claim and in overruling the defendant's objection thereto.

137 Said location notice is in words and figures as follows:

Elm Orlu, Summit Valley Mining District, Deer Lodge County, M. T.

Notice is hereby given that M. McNamee, Chas. E. Savage and I. C. Burkett have this 18th day of April A. D. 1875 located the Elm Orlu Lode bearing gold silver and other metals under the provisions of the act of Congress of May 10, 1872, situated in the mining district aforesaid, and described as follows to-wit: Beginning at the East line of the Poe Lode, thence running along the lode Easterly fifteen hundred feet, together with three hundred feet of surface ground on each side of the center of the vein and marked at each corner by stone mounds. The Discovery post is three hundred feet Easterly from the beginning. The Claimants adjoining are I. W. Barnard & Co. on the West and Anson Ford on the East.

C. E. SAVAGE.

TERRITORY OF MONTANA,
County of Deer Lodge, ss:

On this 19th day of April, A. D. 1875, personally appeared before me the undersigned, a Justice of the Peace in and for said County, Charles E. Savage, and made oath that he and M. McNamee and I. C. Burkett are of lawful age, citizens of the United States, and that the above notice is substantially a copy of the original notice of location of the claim above described, as posted thereon.

ANSON FORD, *J. P.*

138

XXV.

The court erred in failing to find that the Black Rock claim was prior in point of right to the Elm Orlu claim for the additional reason that the Black Rock claim was entered before the Elm Orlu

claim and was purchased from the Government before the Elm Orlu claim and included the conflict area.

XXVI.

The court erred in admitting in evidence the copy of the record from the Land Office upon the application for patent of the claimants of the Elm Orlu claim and in overruling defendant's objection thereto. The said record includes the field notes of the surveyor upon the application for patent, the certificate of the Surveyor General, the statement of fees and charges and abstract of title of the said claim, which refers to the record of the said location notice and to various transfers, a copy of the said location notice, which notice already appears in these specifications, to-wit in Specification XXIV, and application for patent by Michael McNamee, dated the 30th day of September, 1882, in which reference is made to the said location notice and to the abstract of title aforesaid. The said copy of the record also contains sundry other papers, to-wit: the papers usually accompanying an application for patent for a mining claim.

XXVII.

The court erred in finding, holding and deciding that the alleged Pyle strand diverges from the Rainbow vein at any point within the Elm Orlu claim.

139 XXVIII.

The court erred in concluding and decreeing that plaintiffs own all ore bodies in the Rainbow vein between the Elm Orlu west end line and a parallel line projected from where the south wall apex of said vein crosses the common side line, or about 980 feet of said vein.

XXIX.

The court erred in not concluding and decreeing that defendant owns all ore bodies in the Rainbow vein easterly of a plane parallel to the westerly end line of the Elm Orlu claim and drawn through a point on the northerly side line of said claim 190 feet easterly of the southwest corner of the Black Rock claim and extended indefinitely in its own direction.

XXX.

The court erred in concluding and decreeing that the plaintiffs own all or any of the ore bodies in the alleged Pyle strand vein.

XXXI.

The court erred in concluding and decreeing that the Jersey Blue vein on strike or dip intersected or crossed the Rainbow vein and that

the plaintiffs were entitled to all ores of the Jersey Blue vein in the alleged spaces of intersection of that vein with the Rainbow vein.

XXXII.

The court erred in concluding and decreeing that the plaintiffs own all ore bodies in the Creden vein from its divergence at its
140 east end of the Rainbow vein westerly as far as the Creden vein's apex is within the Elm Orlu, bounded by planes parallel to the westerly end line of the Elm Orlu claim, one drawn through the point of such divergence extended indefinitely in its own direction, and the other through the point where the Creden vein crosses the northerly side line of the Elm Orlu claim, extended indefinitely in its own direction.

XXXIII.

The court erred in concluding and decreeing that an account in damages be had.

Wherefore, the said defendant, Butte and Superior Mining Company, prays that the said judgment and decree of the said District Court of the United States, for the District of Montana, be reversed.

W. H. DICKSON,
A. C. ELLIS,
RUSSELL G. SCHULDER,
J. BRUCE KREMER,
L. P. SANDERS,
ALF C. KREMER,
WM. SCALLON,
Solicitors for Defendant.

141 Service of the foregoing Assignment of Errors admitted and copy thereof received this 28th day of December, 1916.

GEORGE F. SHELTON,
W. A. CLARK, JR.,
JOHN P. GRAY,
MYRON A. FOLSOM,
J. L. TEMPLEMAN,
Solicitors for Plaintiffs.

Filed Dec. 28, 1916. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy Clerk.

In the District Court of the United States for the District of Montana.

CLARK-MONTANA REALTY COMPANY, a Corporation and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Petition for Appeal and Allowance.

To the Honorable George M. Bourquin, Judge of the District Court of the United States for the District of Montana:

142 The above-named defendant, Butte and Superior Mining Company, named as defendant above as Butte and Superior Copper Company, Limited, considering itself aggrieved by the decree entered in the above entitled court on the 6th day of July, 1916, in the above entitled cause, does hereby appeal from said decree to the United States Circuit Court of Appeals, for the Ninth Circuit, for the reasons specified in the Assignment of Errors which is filed herewith, and it prays that an appeal be allowed and that a citation issue as provided by law, and that a transcript of the record and proceedings upon which said decree was based, duly authenticated, may be sent to the United States Circuit Court of Appeals, for the Ninth Circuit.

Your petitioner further prays that a proper order touching the security to be required in order to perfect its appeal be made and that in pursuance of the stipulation in writing filed herein and providing for a supersedeas upon the filing of a bond in the sum of Two Hundred and Thirty Thousand ($230,000.00) Dollars, an order of supersedeas be made herein as provided in said stipulation.

W. H. DICKSON,
A. C. ELLIS,
RUSSELL G. SCHULDER,
J. BRUCE KREMER,
L. P. SANDERS,
ALF C. KREMER,
WM. SCALLON,
Solicitors for Defendant.

143 The foregoing petition is hereby granted and the appeal is allowed in the above entitled cause and in pursuance of the written stipulation filed herein and because of said stipulation, it is ordered that said appeal shall operate as a supersedeas upon the appellant filing a bond in the sum of Two Hundred and Thirty Thousand ($230,000.00) Dollars with sufficient surety or sureties to be conditioned as required by law.

BOURQUIN,
Judge of the District Court of the United States for the District of Montana.

Service of the foregoing — for appeal and allowance admitted, and copy thereof received this 28th day of December, 1916.

JOHN P. GRAY,
MYRON A. FOLSOM,
GEORGE F. SHELTON,
W. A. CLARK, JR.,
J. L. TEMPLEMAN,
Solicitors for Plaintiffs.

Filed Dec. 28, 1916. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy Clerk.

144 Know all men by these presents, that the National Surety Company, a corporation duly organized and existing under the laws of the State of New York, and having its principal offices in the City of New York, hath made, constituted and appointed, and does by these presents, make, constitute and appoint M. J. Sheehan and P. C. Goodwin of Butte, and State of Montana its true and lawful Attorneys, with full power and authority hereby conferred in its name, place and stead, to sign, execute and acknowledge, either jointly or severally, a Two Hundred Thirty Thousand (230,000) Dollars supersedeas bond for Butte and Superior Copper Company, Ltd. on appeal from a judgment in the United States Court, District of Montana in favor of Clark-Montana Mining Company and Elm Orlu Mining Company and to bind the National Surety Company thereby as fully and to the same extent as if such bonds were signed by the President, sealed with the common seal of the Company, and duly attested by its Secretary, hereby ratifying and confirming all the acts of said Attorneys pursuant to the power herein given. This Power of Attorney is made and executed pursuant to and by authority of the following By-Law adopted by the Board of Directors of the National Surety Company at a meeting duly called and held on the Second day of February, 1909.

"Article XII. Resident Office-s and Attorneys-in-Fact.

145 "Section 1. The President, First Vice-President or any "other Vice-President may from time to time appoint Resident "Vice-Presidents, Resident Assistant Secretaries and Attorneys-in-"Fact to represent and act for and on behalf of the Company, and "either the President, First Vice-President, or any other Vice-"President, the Board of Directors or the Executive Committee may "at any time remove any such Resident Vice-President, Resident "Assistant Secretary or Attorney-in-Fact and revoke the power and "authority given him.

"Section 4. Attorneys-in-Fact. Attorneys-in-Fact may be given "full power and authority to execute for and in the name and on "behalf of the Company, any and all bonds, recognizances, con-"tracts of indemnity and other writings obligatory in the nature of "a bond, recognizance or conditional undertaking, and any such "instrument executed by any such Attorney-in-Fact shall be as bind-"ing upon the Company as if signed by the President and sealed and "attested by the Secretary.

And, at a meeting of the Board of Directors of the National Surety Company, duly called and held on the Seventh day of March, A. D. 1912, a quorum being present, the following additional section to the foregoing By-Law was adopted:

"Section 6. Attorneys-in-Fact. Attorneys-in-Fact are hereby au-
"thorized to verify any affidavit required to be attached to bonds,
"recognizances or contracts of indemnity, policies of insurance and
"all other writings obligatory in the nature thereof, and are
146 "also authorized and empowered to certify to a copy of any
"By-Law contained in Articles VI, XII, and XIII of the
"By-Laws of the Company.

In witness whereof, the National Surety Company, has caused these presents to be signed by its President and its corporate seal to be hereto affixed, duly attested by its Assistant Secretary, this 11th day of December, A. D. 1916.

W. A. T.
NATIONAL SURETY COMPANY,
By WM. B. JOYCE, *President.*

Attest:
[SEAL.] WM. A. THOMPSON,
Assistant Secretary.

STATE OF NEW YORK,
County of New York, ss:

On this 11th day of December, A. D. 1916, before me personally came Wm. B. Joyce, to me known, who being by me duly sworn, did depose and say, that he resides in the City of New York; that he is the President of the National Surety Company, the corporation described in and which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation, and that he signed his name thereto by like order.

H. E. EMMETT,
Notary Public, Kings County, No. —.

147 Certificate filed in New York County No. 20. Nassau. Bronx No. 1. Queens No. 81. Richmond and Westchester Counties. Kings County Register's Office No. 3003. New York County Register's Office No. 3023. Bronx County Register's Office No. 304.

My commission expires March 30, 1918.

148 In the District Court of the United States for the District of Montana.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Bond on Appeal.

Know All Men by These Presents:

That we, Butte and Superior Mining Company, a corporation, designated in the above styled action as the Butte and Superior Copper Company, Limited, a corporation, as principal, and National Surety Company, a corporation, organized and existing under and by virtue of the laws of New York, as surety, are held and firmly bound unto the Clark-Montana Realty Company, a corporation, and Elm Orlu Mining Company, a corporation, in the sum of Two Hundred and Thirty Thousand ($230,000.00) Dollars, for the payment of which well and truly to be made, we bind ourselves
149 jointly and severally and each of our successors and assigns, firmly by these presents.

Sealed with our seals and dated this 28th day of December, 1916.

Whereas, the above-named defendant, to-wit: the principal in this obligation, has prosecuted an appeal to the United States Circuit Court of Appeals for the Ninth Circuit, to reverse a decree made and entered in the said cause on the 6th day of July, 1916, in favor of the said plaintiffs:

Now, therefore, the condition of this obligation is such that if the said defendant shall prosecute its said appeal to effect and answer all damages and costs if it fails to make its plea good and if the said decree be affirmed by the said United States Circuit Court of Appeals or by the Supreme Court of the United States, then the above obligation to be void, otherwise to remain in full force and virtue.

It is expressly agreed by the National Surety Company, the surety above-named, that in case of a breach of any condition of this bond the court may, upon notice of not less than ten (10) days to said National Surety Company, proceed summarily in this action to ascertain the amount which said surety is bound to pay on account of such breach, and render judgment against the said National
150 Surety Company, and award execution therefor.

NATIONAL SURETY COMPANY,
By (PHIL C. GOODWIN),
Its Attorney in Fact.
P. C. GOODWIN.
By M. J. SHEEHAN, *Its Attorney in Fact.*
BUTTE AND SUPERIOR MINING COMPANY,
By J. L. BRUCE, *Mgr. & Agent.*

The foregoing bond on appeal is hereby approved this 28th day of December, 1916.

BOURQUIN,
Judge of the District Court of the United States for the District of Montana.

Service of the foregoing bond on appeal acknowledged, approved and copy thereof received this 28th day of December, 1916.

GEORGE F. SHELTON,
W. A. CLARK, JR.,
MYRON A. FOLSOM,
JOHN P. GRAY,
J. L. TEMPLEMAN,
Solicitors for Plaintiffs.

151 Filed Dec. 28, 1916. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy Clerk.

In the District Court of the United States for the District of Montana.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Stipulation.

It is hereby stipulated and agreed by and between the parties hereto that the bond on appeal and supersedeas bond staying execution on judgment herein shall be fixed at the sum of $230,000.00 with the consent of the court, and that all process herein be stayed pending appeal of the above styled action.

Dated this 8th day of December, 1916.

JOHN P. GRAY,
MYRON A. FOLSOM,
GEORGE F. SHELTON,
W. A. CLARK, JR.,
J. L. TEMPLEMAN,
Solicitors for Plaintiffs.

152

W. H. DICKSON,
A. C. ELLIS,
RUSSELL G. SCHULDER,
J. BRUCE KREMER,
L. P. SANDERS,
ALF C. KREMER,
WM. SCALLON,
Solicitors for Defendant.

Filed Dec. 28th, 1916. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy Clerk.

153 In the District Court of the United States for the District of Montana.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Citation of Appeal.

The President of the United States to the Clark-Montana Realty Company, a Corporation, and Elm Orlu Mining Company, a Corporation, and to John P. Gray, Esq., J. L. Templeman, Esq., and Myron A. Folsom, Esq., their Solicitors:

You are hereby cited and admonished to be and appear before the United States Circuit Court of Appeals, for the Ninth Circuit, at the City of San Francisco, State of California, within thirty (30) days from the date hereof pursuant to an appeal filed in the office of the Clerk of the District Court of the United States, for the District of Montana, wherein Butte and Superior Mining Company, designated as the Butte and Superior Copper Company, Limited, a corporation, in the above styled cause, is the appellant, and Clark-Montana Realty Company, a corporation, and Elm Orlu Mining Company, a
154 corporation, are appellees, to show cause, if any there be, why the said decree in the said appeal mentioned should not be corrected and why speedy justice should not be done to the parties on that behalf.

Witness the Honorable, George M. Bourquin, Judge of the United States District Court, for the District of Montana, this 28th day of December, A. D. 1916, and of the Independence of the United States the one hundred and forty-first, at the City of Butte, State of Montana.

GEO. M. BOURQUIN,
Judge of the District Court of the United States for the District of Montana.

Service of the foregoing citation on appeal acknowledged and copy thereof received this 28th day of December, A. D. 1916.

GEORGE F. SHELTON,
W. A. CLARK, JR.,
JOHN P. GRAY,
MYRON A. FOLSOM,
J. L. TEMPLEMAN,
Solicitors for Plaintiffs.

Filed Dec. 28, 1916. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy Clerk.

155 In the District Court of the United States for the District of Montana.

In Equity.

No. 19.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Præcipe to the Clerk for Preparation of Transcript on Appeal

To George W. Sproule, Clerk of the United States District Court in and for the District of Montana:

You will please prepare a transcript on appeal herein, including therein the following papers, to-wit:

Final record herein, including the Bill of Complaint, Subpœna in Equity, Answer of Defendant, Reply of Plaintiffs, Findings and Conclusions of the Court, Decree, Certificate of the Clerk; also include in said transcript the Opinion of the Court in deciding the case, Statement of Evidence and Proceedings, Stipulation with reference to form of preparation of record, Stipulation settling statement of evidence, Stipulation that exhibits may be certified in their original form and made a part of the record herein and a part of the
156 statement herein; Stipulation of August 4th, 1914, extending time to answer; Stipulation of October 5th, 1914, extending time for plaintiffs to plead; Stipulation of November 30th, 1914, amending Bill of Complaint; Stipulation of March 17th, 1916, between the parties; Assignment of Errors; Petition for Appeal and Order Allowing Same; Bond on Appeal and Order Allowing Same; Stipulation with reference to bond; Citation and Acknowledgment of Service Thereon; this Præcipe; and Certificate of Clerk.

W. H. DICKSON,
A. C. ELLIS,
RUSSELL G. SCHULDER,
J. BRUCE KREMER,
L. P. SANDERS,
ALF C. KREMER,
WM. SCALLON,
Solicitors for Defendant.

Due service of the foregoing præcipe admitted this 6th day of January, 1917; and the right to file a præcipe herein, indicating additional portions of the record, to be included in said transcript,

is hereby waived; and consent is given that the said transcript may be immediately prepared, containing the portions of said record indicated in the above and foregoing præcipe.

JOHN P. GRAY,
GEORGE F. SHELTON,
J. L. TEMPLEMAN,
MYRON A. FOLSOM,
W. A. CLARK, JR.,
Solicitors for Plaintiffs.

157 Filed Jan. 6, 1917. Geo. W. Sproule, Clerk, by Harry H. Walker, Deputy Clerk.

In the District Court of the United States for the District of Montana.

In Equity.

No. 19.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Petition for Order Extending Time for Filing Record.

To the Honorable Judge of the above entitled Court:

Your petitioner, the above named defendant, Butte and Superior Copper Company, through its counsel, does petition and request the above styled court to make an order extending the time for the filing of the record on appeal in the above case until the 12th day of March, 1917.

158 Your petitioner respectfully recites that the record in the above case is a large and voluminous one, to-wit: comprising over 1,800 pages. Your petitioner further respectfully shows that it is impossible to compare the record and file the same with the court, and therefore requests that an extension may be granted.

Your petitioner further respectfully shows that counsel for the defendant in the above entitled action have consented to, and are willing, that this court make an order extending the time for filing the record on appeal until and including the 12th day of March, 1917; and have stipulated that said order may be granted without enforcing of any right that the defendant herein might have; and that the same might be with the same force and effect in the Circuit Court of Appeals for the Ninth Circuit, as if filed within thirty (30) days after the taking of the appeal.

Wherefore, your petitioner prays this Honorable Court to make an

order extending the time for filing the record on appeal in the above styled case, up to and including the 12th day of March, 1917.

W. H. DICKSON,
A. C. ELLIS,
RUSSELL G. SCHULDER,
J. BRUCE KREMER,
L. P. SANDERS,
ALF C. KREMER,
WM. SCALLON,
Solicitors for Defendant.

Filed Jan. 19, 1917. Geo. W. Sproule, Clerk, by C. R. Garlow, Deputy.

159 In the District Court of the United States for the District of Montana.

In Equity.

No. 19.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Stipulation.

It is hereby stipulated and agreed, by and between the parties hereunto, through their respective counsel, that the time for filing the record on appeal in the Circuit Court of Appeals for the Ninth Circuit, may be extended up to and including the 12th day of March, 1917; and that the record might be filed in said Court within said time, according to the defendant the same right that it would have if the said record was filed within thirty (30) days from the taking of the said appeal, as provided by law and the rules of Court.

Dated his 17th day of January, 1917.

W. H. DICKSON,
A. C. ELLIS,
RUSSELL G. SCHULDER,
J. BRUCE KREMER,
L. P. SANDERS,
ALF. C. KREMER,
WM. SCALLON,
Solicitors for Defendant.
JOHN P. GRAY,
MYRON A. FOLSOM,
GEORGE F. SHELTON,
W. A. CLARK, JR.,
J. L. TEMPLEMAN,
Solicitors for Plaintiff.

Filed Jan. 19, 1917. Geo. W. Sproule, Clerk, by C. R. Garlow, Deputy.

160 In the District Court of the United States for the District of Montana.

In Equity.

No. 19.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Order Extending Time for Filing Record on Appeal.

Upon petition and stipulation of counsel, and for good cause shown, and the Court being fully advised in the premises,

It is hereby ordered, that the time for filing the record on appeal in the above styled cause in the Circuit Court of Appeals for the Ninth Circuit is enlarged, and is hereby extended to and including the 12th day of March, 1917.

Dated this 19th day of January, 1917.

BOURQUIN, *Judge.*

161 *Statement of Evidence.*

Be it remembered, that the above entitled action came regularly on for trial and final hearing before the Honorable George M. Bourquin, Judge of the said court, on the 18th day of October, 1915, upon said cause being called for trial, John P. Gray, Myron T. Folsom, J. L. Templeman, Geo. A. Shelton and W. A. Clark, Jr., appeared as solicitors for the complainants, and W. H. Dickson, A. C. Ellis, Wm. Scallon and J. Bruce Kremer, appeared as solicitors for the defendant. Thereupon the following proceedings were had and done and the following evidence and none other was introduced, to-wit:

Testimony of W. J. Parks for the Plaintiff.

W. J. PARKS, a witness for plaintiff, after being first duly sworn, testified as follows:

Direct examination.

By Mr. Gray:

Q. State your name and residence?
A. W. J. Parks, Mill Creek, Madison County.

Q. What is your business?
A. Prospecting and mining.
Q. How long have you lived in Montana?
A. Since 1862.
Q. Have you followed the business of mining and prospecting during all that time?
162 A. Pretty much, yes, sir.
Q. When did you first come to Butte?
A. 1865.
Q. How long did you remain?
A. Why, I was here about 18 or 20 years, something like that, I think.
Q. Were you acquainted with a mining claim known as the Elm Orlu?
A. Yes.
Q. When did you first become acquainted with that claim?
A. About 1875, I think.
Q. How did you come to know it or see it at that time?

Mr. Dickson: What is the purpose of this testimony?
Mr. Gray: To prove the discovery and that the monuments were on the ground.
Mr. Dickson: At the time the patent for the Elm Orlu was issued the fact of the discovery and all other facts necessary to entitle the applicant to a patent were conclusively determined by the patent. I take it that my friend admits that the purpose of this testimony is to carry the patent back by relation to a date anterior to the date of its issuance.
Mr. Gray: To a date prior to the location of the Black Rock.
Mr. Dickson: In other words, to carry the patent back by relation to a date anterior to the issuance of the patent, is that so?
163 Mr. Gray: That is true.
Mr. Dickson: We object to all such testimony as incompetent and irrelevant. The patent is conclusive of the fact that they had a valid discovery at the time the patent was issued, and that they had taken all the antecedent steps necessary to entitle the patent to be issued prior to the date of the entry of that patent, and we object to any attempt or any evidence offered for the purpose or with a view to carrying the patent back by relation to a date anterior to the date of the final entry because, first, it is immaterial; because it is incompetent; because it appears on the face of the complaint, to which is annexed a copy of the pretended declaratory statement of the Elm Orlu location, that it was fatally defective; that a patent can only be carried back by relation to the time when a valid location had been made. If they can show a valid location anterior to the issuance of patent or the final entry, that is perhaps proper, but as it stands now, and as we construe the pleadings and the patent and declaratory statement of the Elm Orlu location, a copy of which is made an exhibit to the complaint, it is impossible that there could have been a valid location, but it is an attempted location merely, and we make one general objection to all the testimony offered for the purpose of carrying this patent back to a date anterior at least to

the date of the final entry. If the testimony is ruled in over our objection, we take an exception, of course, and when it is all in, we will move to strike it out, and in support of the motion to
164 strike, we wish to be heard at some length in argument, because even if your honor should take the matter up during an intermission of one or two or three days when the ruling is made it would of necessity obviate a considerable part of the time that this trial will require. I suppose that it may be understood that all testimony offered for the purpose of carrying this patent back by relation to a date anterior to the date of final entry or the date of patent is objected to by the defendant on the ground that the same is incompetent and irrelevant, and if it is ruled in, that an exception may be noted.

Mr. Folsom: We prefer, if your honor please, to put in this evidence at this time and reserve until the close of the case the argument of the question of its admissibility. We contend that this evidence is admissible, not only to prove a discovery and a valid location at the time we allege in our complaint and that the location was made, but also to prove possession by the locators for a period equal to the statute of limitations which was then in force. We shall contend that the location notice was cured by the patent proceedings, that they were completed, and that a conclusive adjudication that the location notice was good was made, it having been accepted, and we also contend that a certain act of the legislature of Montana cured the defective certificate, if defective it was. All of those questions are very important ones for argument, and I suggest that we have our argument all at once.

165 The Court: Very well, for the time being the objection will be overruled and exception may be noted and to all this line of testimony the same ruling will be understood and the exception thereto. The court believes it is the better practice, because, even if it should ultimately be stricken out, it is then before the appellate court, if it is necessary for them to review it, and it might avoid a retrial of the case.

Q. (Repeated.) How did you happen to become acquainted with the Elm Orlu claim?

A. I was prospecting around there and looking around and I saw it.

Q. What did you see?

A. I saw a discovery there and a mine staked out.

Q. Describe the discovery?

A. Why, it was a hole about as deep as a man can well throw it out with a shovel, 12 or 13 or 14 feet, something like that.

Q. What was disclosed in the discovery at the time?

A. Why, there was a vein of some kind of ore, a kind of black manganese, we called it here.

Q. What else did you see there to indicate that the ground had been located?

A. I saw the stakes and this hole.

Q. The stakes, you say?

A. Yes, sir.
Q. Just describe the stakes, how they were marked?
A. Why, there was a stake put down and a lot of stone, a monument of stone built up around it.
166 Q. Where were they?
A. On the corner.
Q. Now, Mr. Parks, were you acquainted with the locators of the Elm Orlu at that time?
A. Yes, one; yes; I was acquainted with two of them; I think that was all there was of them.
Q. Who were they?
A. Savage and I think Burkett.
Q. Did you know Jeff McNamie?
A. No; I don't think McNamie was in the discovery—I don't know—he might have been.
Q. Did you see it more than once that year?
A. Oh, yes, I saw it several times passing back and forwards.
Q. Did you know a man by the name of Lowe?
A. Yes, sir.

Mr. Gray: It is agreed between us, if your honor please, that the deposition of Mr. Parks, together with the depositions of certain other witnesses taken before Mr. Frank Reilly may be read, and that the direct and cross examination of this witness here on the stand shall only go to the points which have already been brought out.

Mr. Kremer: That is, subject to the objections contained in the depositions themselves.

Mr. Dickson: And subject to the objection that it is all irrelevant and incompetent and that it will serve no purpose whatever except to carry the patent back by relation.

The Court: Very well.

167 Cross-examination.

By Mr. Kremer:

Q. You say, Mr. Parks, that you saw a hole upon the Elm Orlu?
A. Yes, sir; it was called the discovery hole.
Q. What claim was immediately next to the Elm Orlu upon the date of your first visit to the Elm Orlu?
A. Which way?
Q. Well, adjoining it in any direction?
A. Well, now, I don't know; I don't remember; I don't know that there was any. There might have been; I rather think that there was one on the west.
Q. What was that claim?
A. I think the Pozer, or something like that.
Q. Who had located the Pozer at that time?
A. A man by the name of Lesler, I think it was.
Q. What other claims do you recall that immediately joined the Elm Orlu?
A. I don't remember.

Q. Did you know Burkett?
A. Yes, sir.
Q. Who was Burkett; can you tell us anything about him; who was he?
A. Why, he was around here a while; for a year or two; that is all I know about him.
Q. Did you know Savage?
A. Yes, I know him.
Q. You knew Lowe pretty well?
168 A. Yes.
Q. You were pretty friendly with Lowe?
A. Yes.
Q. As a matter of fact, your first interest in the Elm Orlu was created by talking to Lowe about it, wasn't it?
A. No; I had saw the Elm Orlu and liked it pretty well as a vein before I talked to Lowe about it.
Q. You acquired an interest through Lowe, did you, later?
A. Yes. sir.
Q. You say that there was a hole how deep when you first visited it?
A. Oh, 12 or 13 or 14 feet, something like that; as deep as a man could throw it out with a shovel.
Q. Who was working in it when you saw it?
A. I don't think anybody was. I don't remember anybody being working there.
Q. Who was with you when you visited the claim the first time?
A. I don't think there was anybody; I don't remember of anybody being with me.
Q. Do you remember all of the claims that you visited in 1875?
A. Oh, no, and probably I wouldn't have remembered this if I had not become interested in it.
Q. How long after that did you become interested in it?
A. Well, I think it was in maybe about two years.
169 Q. Had you visited the claim between the time of your first visit and the time you become interested?
A. Yes, sir, I did.

Mr. Gray: That is all covered by the cross-examination in the deposition.
Mr. Kremer: It is a matter of his recollection of the original discovery.

A. Yes, I was there several times.
Q. Was it in the fall that you visited the Elm Orlu in 1875, or do you remember; tell us the date?
A. Oh, I don't remember; it was perhaps along some time in the summer; I might have been hunting grouse when I first saw it.
Q. Do you remember that you were hunting grouse?
A. No. I might have been, I say.
Q. How are you able to fix the time of your visit to the Elm Orlu in 1875, the first visit?

A. Well, the first visit—it was about that time in 1875 I am pretty sure that I was mining over here on the Parrot.

Q. What is the way you fix it, that it was about that time?

A. Yes, sir.

Q. As a matter of fact you mined over on the Parrot in 1876, didn't you, and had 30 men working for you?

A. Yes; I think it was a year or so before I became interested in it that I seen it then and knowed it.

170 Q. A year or so before?

A. Yes, and maybe it might have been two years; I can't tell.

Q. It may have been; you are not sure of the date?

A. No, I am not; I can't remember 30 or 40 years, and another man's business.

Q. Certainly not, Mr. Parks, and you wouldn't be sure of just what time it was when you first saw the Elm Orlu?

A. Well, it was about that time.

Q. You are not sure; you are only estimating in a way about when it was that you first saw the Elm Orlu?

A. Well, I am pretty confident it was along in '75 or '76; I am pretty sure it was '75.

Q. But you would not attempt to fix the date any more definitely than that you are pretty sure it was in '75 or '76, would you?

A. Yes; I think '75.

Q. You were operating, as I said a while ago, to refresh your memory, you were operating over on the Parrot?

A. Yes, sir.

Q. And you had about thirty-five men working for you?

A. In '76 I had about twenty-five or thirty.

Q. You were the largest operator about here at that time; nobody was employing more men?

A. Oh, I don't know.

Q. Well, you were one of the largest, were you not?

171 A. Well, I was among them, yes.

Q. And you remember that was in '76?

A. That was in '76, I think.

Q. And you state that you at that time, that you first visited the Elm Orlu, were operating over on the Parrot, do you not?

A. Yes.

Q. That is the fact?

A. Yes.

Q. And that was in '76?

A. I was operating on the Parrot in '73,—'74—'73 or '74.

Q. Did you have these thirty men working for you?

A. Not at that time.

Q. Not at what time?

A. In '75. I think it was '76 I had the thirty men.

Q. You had the thirty men working for you in '76?

A. Twenty-five or thirty. Yes, I think it was the year of the Custer massacre that I became interested in it.

Mr. Dickson: Speak a little louder.

A. It was the year of the Custer massacre that I got interested in the Elm Orlu.

Q. That was the time you saw the Elm Orlu?

A. No, that I got interested in it.

Q. That was when you got your conveyance from Lowe?

Mr. Gray: I object to that. That was gone into on direct examination and it is covered completely by the testimony which
172 we are going to read, the date he got his conveyance.

Mr. Dickson: He is testifying to the date of the presumed or alleged discovery.

The Court: If you have any instrument showing the conveyance, the witness is entitled to see it without compelling him to guess about the date of the instrument. The objection is sustained to the question.

Q. Now, Mr. Parks, how far was this hole that you mentioned from the stake which you say that you saw?

A. The stakes?

Q. Yes.

A. Oh, I don't know. I didn't step the ground or pay any attention to it.

Q. Do I understand you, Mr. Parks, to say that when you went up on this claim in '75, when you might have been hunting for grouse, that you walked around the four corners of that claim?

A. No, sir, I did not say I walked around the four corners of that claim at that time.

Q. Now, was that done later again in '75, and you walked around the four corners of the claim?

A. Yes, sir.

Q. What time in '75 was that?

A. That was in '76, I think, when I was working on it; when I was representing it.

Q. Then I understand, Mr. Parks, that the time that you say that you saw these corners marked was in '76?

173 A. How?

Q. The time that you saw the corner posts upon the ground was in '76?

A. Yes, the time I noticed them, yes.

Q. First time you noticed them?

A. Yes.

Q. How old are you, Mr. Parks?

A. My age?

Q. Yes.

A. I will be seventy-six the last day of this month.

Redirect examination.

By Mr. Gray:

Q. Mr. Parks, to make clear one question, with reference to your trip up there in '75, did you see the posts of the claim at that time, or any of them?

A. Yes, I saw some of them; saw that it was a location and staked off.

Q. That was in 1875?

A. That was in '75 I saw some some stakes there; yes, sir.

Q. The first time I understand though that you followed them around was later when you were working?

A. Yes, when I was working, when I went around.

Q. But you saw them there on your first trip?

A. Yes.

Recross-examination.

By Mr. Kremer:

Q. Mr. Parks, what posts did you see upon the occasion of your first visit there?

174 A. Well, I saw the two on the west end, the north and south. I remember it was when I come up, come west and I saw the two posts standing there.

Q. You just saw the two posts upon the west end?

A. Yes, that was the first.

Q. First time?

A. Yes.

Q. How many posts were there on the west end of the Elm Orlu?

A. Only two.

Q. You are sure of that?

A. That is all I saw. I think that is all I looked for; that is all they generally put up.

Q. That is all you remember now that you saw?

A. At that time, yes.

Q. The Poser had been located prior to that time you stated?

A. I didn't notice that if it was.

Q. Didn't you state that the Poser was the claim adjoining the Elm Orlu on the west at that time?

A. It might be; It might have been located then.

Q. Might it be the Poser posts that you saw?

A. It might have been, yes, sir.

Redirect examination.

By Mr. Gray:

Q. Did you in 1877 or '8 go around again to the posts of the Elm Orlu?

A. Yes, sir.

Q. Can you say whether the posts that you saw in 1878,

175 when you went to them, where they were with reference to these two on the west end that you saw in '75.

A. I think they were, yes; I took them to be the same.

Q. Where were they located with reference to where you saw them in '75.

A. Oh, yes, yes.

Q. Same place?
A. Same place, I think.

Recross-examination.

By Mr. Kremer:

Q. What markings were upon these posts?
A. What markings?
Q. What markings were upon these posts?
A. They were No-. 1, 2, 3 and 4.
Q. What else?
A. Elm Orlu.
Q. They were marked?
A. Yes, sir.
Q. In what year was that.
A. '76 I think—'77—I think '76.
Q. At what corner of the claim was post No. 1?
A. Post No. 1 was at the southwest corner.
Q. Now, No. 2?
A. No. 2 would be the southeast corner.
Q. Now, No. 3?
A. Northeast corner?
Q. No. 4 would be——
A. The northwest corner.

(Witness Excused.)

176 Mr. Gray: I will read the deposition of Mr. Parks, taken and filed.

"Direct examination by Mr. Gray:

Q. State your name, Mr. Parks?
A. W. J. Parks.
Q. Where do you reside?
A. Well, at present, I am over in Madison County, Mill Creek.
Q. Madison County, this state?
A. Yes, sir.
Q. What is your business?
A. Prospecting.
Q. How long have you lived in Montana?
A. Well, it's quite a while; since '62, I believe.
Q. Did you ever live in Butte?
A. Yes, sir.
Q. When did you first come to Butte?
A. '65.
Q. And how long did you remain in Butte—make that your home?
A. '65—eighteen or nineteen years.
Q. During that time, what business or occupation were you engaged in?
A. Mining.

Q. Mr. Parks, are you acquainted with a mining claim known as the Elm Orlu?

Mr. Kremer: We object to the question and to all similar questions going to prove occupancy or possession by the Clark-Montana
177 Realty Company, or its predecessors in interest, or by the Elm Orlu Mining Company, or its predecessors in interest, at the time in question, for the reason that, if it is sought to prove title by occupancy or possession, it is incompetent, irrelevant and immaterial, for the reason that it does not appear that any title is claimed, or has ever been claimed, by the said Clark-Montana Realty Company or the Elm Orlu Mining Company, or their predecessors in interest, by reason of occupancy or possession; and no such claim can be made, in view of the fact that it does not appear that the basis of the title of said companies, or their predecessors in interest, depends or rests upon occupancy or possession, it appearing from public records that the claim is otherwise and rests upon a location notice; and for the reason stated in the first objection here interposed. That same stipulation may be made, I assume, that this objection may go to all this character of testimony, without repetition?

Mr. Gray: Yes."

Mr. Kremer: In considering the presentation of this testimony we will reserve, I assume, your ruling, as in the last instance.

The Court: If anything is not competent the court will give it no consideration in making up its decision.

"A. Yes, sir.

Q. What year did you first become acquainted with that claim?

A. '75.

178 Q. How did you happen to become acquainted with it in the year 1875? First, did you know any of the locators of the claim?

A. Yes, sir.

Q. Who?

A. Savage and I think it was Burkett.

Q. Did you know a man by the name of McNamie, also?

A. Yes, sir.

Q. How did you happen to become acquainted with it in the year 1875? What were you doing?

A. I was doing something like my friend Meagher there; I was "ratting" around, to see if I couldn't jump something, steal something from some fellow.

Q. You were prospecting in that vicinity?

A. Yes, sir.

Q. Did you observe the discovery of that claim in that year?

A. Yes, sir.

Q. Just tell how large a shaft there was there at that time or opening at the discovery?

A. Oh, I don't remember exactly, but I would say as deep as a man could throw it out; it was probably twelve feet.

Q. You were familiar with the size of discoveries required in the location of mining claims?

A. Yes, sir.
Q. Was this of the full size?
A. Sure thing, yes, sir.

179 Mr. Kremer: It is understood that this objection goes to all this testimony?
Mr. Gray: Yes, general objection.
Mr. Kremer: The general objection may go to all of it.

Q. Did you see that claim more than once that year?
A. Oh, I think I did, yes; I was over the ground several times.
Q. Did you ever see Mr. McNamie up there that year, or any of the other owners?
A. No, sir, I don't think I did.
Q. Did you know a man by the name of Lowe?
A. Yes, sir.
Q. In the following year, 1876, were you upon the Elm Orlu mining claim?
A. Yes, sir.
Q. Did you observe it at that time?
A. Yes, sir.
Q. How frequently during that year?
A. Oh, I don't know; I was up there, oh, three or four times, or more; I was over that ground quite frequently.
Q. Now, during that year, 1876, was there any work done upon the claim?
A. Yes, sir.
Q. About how much, Mr. Parks?
A. Oh, enough to hold it, or represent it.

Mr. Kremer: I move to strike out the answer, as a conclusion of the witness, and not responsive."

180 Mr. Kremer: We will waive that.

"Q. More than one hundred dollars' worth of work done that year?

Mr. Kremer: Object to that as leading.

A. Yes, sir.
Q. Well, how much in money was the value of the work which was done that year?
A. Hundred, all right.
Q. One hundred dollars?
A. Yes, sir.
Q. Now, in the next year, 1877, and 1878, the next two years, was any work done on that claim?
A. Yes, sir.
Q. Who did, or caused to be done, that work?
A. I did.
Q. Now, how did you happen to do the work there during the years 1877 and 1878?

A. Well, I done it through Mr. Lowe, for Mr. Lowe. He was an old acquaintance. He wasn't able to do it; he had a stroke of paralysis over in Trapper, and he wasn't able to.

Q. Under what agreement, if any, did you do the work, or cause it to be done, during those two years?

A. I got an eighth interest in the mine.

Q. Did you do the work yourself or hire it done?

A. Hired it done.

Q. How much work did you do during each of those years?

A. Well, done a couple of hundred dollars' worth.

181 Q. How much during the year 1877?

A. One hundred dollars.

Q. And how much during the year 1878?

A. Hundred.

Q. Now, during either of those years, who did the work for you, if you recollect?

A. Well, I don't recollect now who did. I had several men working; sometimes, as high as twenty-five or thirty.

Q. In different places?

A. Yes, sir, on the Parrot——

Q. Do you recall, during either of the years 1877 or 1878, anyone going up and doing any work on that ground, or attempting to?

A. Well, yes. I sent a man up there, Mr. Whiteman, and there was a couple of fellows there run him off, and he come down, and I went back with him.

Q. Just what did you do when he came down?

A. I got an old Henry rifle and went up and told them to let this boy alone, that they could work all they wanted to, but not to move any ore.

Q. What did they do?

A. Well, Mr. Whiteman told me they worked three or four hours, or such a matter, and "pulled their freight."

Q. Did you ever see them there again?

A. No, sir.

Q. Or before that time?

A. No, sir; never saw them before or after.

182 Q. At that time, and upon that occasion, did you go and examine the posts of the claim?

A. Yes, sir; I think I went to see if they were all up, or a part of them, anyway, if I didn't all.

Q. What was the fact as to whether or not they were standing?

A. All satisfactory.

Q. By that, what do you mean? What do you mean by "all satisfactory?"

A. They were all right; looked to me they were good enough.

Q. How large were those posts?

A. Oh, might have been—some, I guess, six or seven inches.

Q. In diameter?

A. Yes, sir.

Q. And how high?

A. Oh, four feet, all right—such a matter; like that (indicating) somewhere.

Q. Now, Mr. Parks, in the year 1879, following the two years that you did the assessment work, was any work done on the claim?

A. Yes, sir; it was leased.

Q. Who to?

A. Sigsby—wasn't it Sigsby? Well, I am not sure. What was his name, Charley Warren?

The Witness Warren: That's his name, Sigsby.

Mr. Gray: Just a moment, gentlemen.

183 Mr. Kremer: That's all right.

Q. Did you ever know a man by the name of Pat Flynn?

A. Yes, sir; Pat Flynn and Sigsby both leased on the ground there.

Q. You recall Pat Flynn having a lease on it, you say?

A. Yes, sir.

Q. What year was that, do you know?

A. It seems to me it was '69—or '79 or '80.

Q. Now, did they work upon the claim under that lease during the year 1879, some of them?

A. Yes, sir.

Q. Just state how much work was done in the year 1879 upon the claim?

A. Oh, I couldn't tell you that; I didn't go up to it. They were leasing there, and took out some ore, and struck water and couldn't go any further.

Q. About how long did they work on the claim during 1879?

A. That I couldn't say exactly; I think they quit somewhere about in July.

Q. That would be in the following year?

A. Yes, sir.

Q. Had they worked right along from the time they took the lease until then?

A. Yes, sir.

Q. About how many men of them were there working there?

184 A. There was three or four.

Q. Can you state whether or not the assessment work was done? or sufficient for assessment work, in the year 1879?

A. Oh, yes; yes, sir.

Q. How much? Was there as much as one hundred dollars' worth of work done that year?

A. Oh, several hundred dollars.

Q. Now, you say that sometime the following July, of 1880, they stopped, and you said something about the water driving them out?

A. Yes, sir; they had more water than they could handle with a whim and horse, more than they could handle, and I offered to put in pump, but they wouldn't give me the mine for security.

Q. What was done with the ore they took out?

A. They shipped it to Williams, I think. That is where they told me they were going to take it.

Mr. Kremer: I move to strike out what they told him."

Mr. Kremer: Proceed. I presume the court will consider all of this.

The Court: Yes, I might say that if any of these objections you want the benefit of you ought to bring them to the attention of the court now and the court will rule.

Mr. Kremer: I do not see how any great prejudice will result by eliminating the ruling because you will not naturally con-
185 sider any of them that are objectionable, and upon that consideration we will waive our objections.

"Mr. Gray: Yes, what they told him.

Q. Was it taken away?
A. Yes, sir, taken away.
Q. How about the royalty on it?
A. They told me——

Mr. Kremer: We object as hearsay.

A. —they paid royalty and wouldn't have a prospector's stake, and I told them when they settled up with Williams to keep going.

Mr. Kremer: I move to strike out the answer, as hearsay, and based entirely on what was told the witness.

Q. When conveyance was made of this one-eighth interest that you were to receive for doing the assessment work for those two years, to whom was it conveyed?
A. It was conveyed to my wife.
Q. Her name was Leah M. Parks?
A. Leah M. Parks.
Q. Was that done at the time you did the work or subsequently?
A. Subsequently.
Q. By whose directions was it conveyed to Mrs. Parks?
A. Mine.
Q. How did it happen you didn't have it conveyed immediately, in 1879?
186 A. Oh, we considered it was all right; their word was good.
Q. Now, during each of the years 1875, '76, '77, '78, '79 and '80, what was the fact as to the Elm Orlu claim being a well-known and well-recognized claim in that vicinity up there among miners and prospectors generally?

Mr. Kremer: We object to this, for the reason that the reputation of the existence of the claim would in nowise tend to prove title; it is incompetent, irrelevant and immaterial for any purpose.

A. Well, it was a well-known claim, and considered a valuable claim—got some very fine assays out of it.

Mr. Gray: You may examine.

Cross-examination read by Mr. Kremer:

Q. Who were the two fellows that you ran off the claim?
A. I never saw them before nor since to know them.
Q. Under what name did they claim the property?
A. They didn't claim it at all; they didn't name it; didn't stay long enough to name it.
Q. You ran them off?
A. No, I left them alone; we left them working there.
Q. No, but you stated here of going up there with a gun and running them off, didn't you?
A. No, no, I didn't state that; I stated I went up there with a gun and told them not to run this boy off, Mr. Whiteman; that
187 they could work as long as they pleased, but not to move any ore.
Q. And you stated that they left hurriedly when you went up there with the gun?
A. I left them there; they were working when I come away.
Q. What year was this?
A. In '76—'77; yes, '77.
Q. Was that the year that you did the work for which you received the eighth?
A. Yes, sir.
Q. Was that the first work that you did on the claim?
A. '77, yes, sir.
Q. Was that your first connection with the claim?
A. Yes, sir; only I had been over it.
Q. How do you fix the year?
A. Well, sir, it was the year that Lowe came over from Trapper. Lowe wintered with me that winter.
Q. How do you fix the year that Lowe came over?
A. Oh, I don't know; I have some little recollection of it.
Q. Are you sure that that wasn't 1879?
A. Oh, it wasn't '79, no; yes, I am sure.
Q. Sure it wasn't?
A. Yes, sir.
Q Or 1878?
A. It wasn't '78.
188 Q. That was the same year that Whiteman was doing the work up there?
A. Yes, sir; Whiteman.
Q. What did Lowe have to do with it?
A. Well, he had, I think, a half interest in it, in the mine.
Q. In the Elm Orlu?
A. Yes, sir, he bought it; he bought an interest.
Q. Who from?
A. That I couldn't tell you, whether it was Charley Savage or McNamee he bought it from.
Q. It was the year that Lowe bought the interest from Savage or McNamee?
A. I don't know what year it was.

Q. I say it was the year—the year Lowe came over was the same year he bought the interest?
A. Yes, sir.

By Mr. Gray:

Q. You said you didn't know what year he bought it?
A. I don't know what year he bought it, but he told me—he must have had it just before '76; he must have had it about '76.

By Mr. Kremer:

Q. In other words, Lowe owned the interest when he came over here that time?
A. I think he did.
Q. He told you he did?
A. Yes, sir.
189 Q. And that is the way you fix the date?
A. Yes, sir.
Q. Now, what year was that?
A. '76. Winter or early spring—it was along in the winter some time.
Q. And you had done work on there two years prior to that time?
A. No, sir.
Q. How many years, any?
A. No.
Q. You knew the claim several years prior to that time?
A. I knew the claim in '75.
Q. Well, how many years prior to Lowe coming here did you know it?
A. Well, about a year and a half, or such a matter; that is, he came over in the fall of '76.
Q. Did you have any claims in that vicinity?
A. No.
Q. You were operating down on the Parrot?
A. Yes, sir.
Q. How far was the Parrot from the Elm Orlu claim?
A. Oh, perhaps a good mile, or a little better; maybe a little better—no, I don't think it's over a mile.
Q. What Parrot do you mean—the old Parrot that was operated here for so many years and went into the Parrot Mining Company?
A. Yes, sir.
190 Q. Did you ever try to make a location up in the vicinity of the Elm Orlu claim?
A. I believe not; I don't remember of——
Q. What year did you prospect over that country?
A. Oh, I prospected over it every year; I was through there pretty near every year—take trips—go out, to see if I could see anything open.
Q. In what year did you first prospect over that country?
A. Well, you might say, from '65 right along—'66—'67.

Q. Why didn't you locate the ground upon which the Elm Orlu stands?
A. Well, it was located.
Q. In '65?
A. Yes, sir.

Mr. Kremer: That is all.

Redirect examination.

By Mr. Gray:

Q. You say it was located in '65?
A. '75 I mean.

Mr. Gray: That is all.

Recross-examination.

By Mr. Kremer:

Q. I asked you why you didn't locate it in '75 or '67?
A. Oh, I didn't see any copper there; there was no copper sticking out.
Q. And when did you first see copper there?
191 A. I never saw any there.
Q. You weren't looking for silver?
A. No, I wasn't looking for silver.
Q. Silver was quite high in those days, wasn't it?
A. Yes, sir.
Q. The easiest mined, easiest treated, was it not?
A. We were wild here on copper.
Q. Where were you shipping your copper in '65 or '67?
A. Didn't ship any.

Mr. Gray: I object to that as improper cross-examination.

Mr. Gray: I don't press that objection.

"A. Didn't ship any yet; they never shipped any until '71 or '2.
Q. Why not?
A. Well, there was no railroads closer than Missouri.
Q. Why were you looking for copper in '65 or '67?
A. Well, I had built a smelter over here; I was interested in one.
Q. In '65?
A. '66.
Q. Where did you build a smelter in '66?

Mr. Gray: Objected to as improper cross-examination.

A. Right below the Parrot.
Q. In Butte, in the vicinity of Butte?
A. Yes, sir.
Q. And you fix that date and your subsequent dates from
192 the fact that you built a smelter here in '65 or '66, do you?

A. '66, I built the smelter, fall of '66.
Q. A copper smelter?
A. Yes, sir.

Mr. Kremer: That is all?
Mr. Gray: That is all."

Mr. Gray: I will now read the deposition of Terrence Hughes.

Deposition of Terrence Hughes for the Plaintiff.

"Direct examination.

By Mr. Gray:

Q. What is your name and residence?
A. Terrence Hughes.
Q. You reside where?
A. Walkerville.
Q. And what is your business?
A. I follow mining.
Q. How long have you lived here in Butte, or in the vicinity of Butte?
A. Thirty-five years; going on thirty-six.
Q. What year did you come here?
A. '78.
Q. In the course of your mining experience, have you prospected any?
A. Yes, sir; a good deal.
Q. Are you familiar, or have you been familiar, with a mining claim called the Elm Orlu?
A. Well, I knew of the claim.
193 Q. When was it that you first knew of that claim or its location?
A. Well, I think, about the first time my attention was called to that would be either '79 or '80. Now, I wouldn't be sure which, but I think it was '79.
Q. Will you relate the facts?

Mr. Kremer: The Butter & Superior Copper Company, Limited, objects, for the reason that the testimony is incompetent, irrelevant and immaterial, and does not tend to prove title on the part of the Clark-Montana Realty Company, or its predecessors in interest, or the Elm Orlu Mining Company, or its predecessors in interest, for the reason that there is no basic claim of title upon the question of occupancy or possession, and for the reasons stated in the first objection here interposed. Now, can we not agree here, for the sake of brevity and to avoid repetition, that this objection may go to all this character of testimony—seeking to prove occupancy and possession.

Mr. Gray: Yes, anything, except to the form of the questions, or something of that kind.

Mr. Kremer: Yes. I don't mean as to questions that may be

leading, or anything of that sort, but the general objection as to the competency, relevancy or materiality of your testimony.

Mr. Gray: It is agreed.

Mr. Kremer: The objection may be considered repeated to each of the questions propounded seeking to elicit testimony along
194 the line of title by occupancy or possession.

Q. Go on and state the facts in relation to this mining claim, as you knew them, Mr. Hughes.

A. We were talking, one day, over mining matters, and Mr. Michael McNamee brought up the Elm Orlu, and he was speaking of the parties that done the representing on it while he was absent here, and that was "Bill" McNamara—I believe "Big Bill," we used to call him—you (addressing other witnesses) knew him—was looking after his interest while he was gone, and he was speaking about some assays that he got out of it; so I asked him if he would lease the property, and he said "Yes"; so we agreed on having a lease drawn up. Well, there was another man there, by the name of Allen. Well, he says, "I want to go in." I says, "All right." So then we went and took a look at the property, and took some samples; I took the samples out of it; it was pretty favorable, and he wanted four men in there, in place of two.

Q. Who did?

A. This man Allen. I kind of objected to that, four men. I says, "If there is anything there," I says, "We can get along better with two—two can get along better than four." Well, he insisted on it, and, "Well, then," I says, "you pick one man and I'll pick another." Well, he mentioned his name—you (addressing other witnesses) knew the man, too—Pat Flynn. And it run on then for a few days more, and he came across the street after me,
195 one evening, and he says, "This lease is all drawn out now, all ready to be signed by you, and," he says, "I will want the name of the fourth man." In the meantime, there was a fellow spoke to me, and says, "You are taking in some more men in there, and what would my show be?" I says, "It would be all right." So he says to me, this evening, he says, "We need the fourth man." "Well," I says, "I have got him." He says, "Who is he?" I says, "John Boyle." "Oh," he says, "he won't do." He says, "Johnny Carney would be the man." So he had the pick of the first man and the last man, so I says, "Then, I am out of it."

Mr. Kremer: We move to strike out the statement of the witness with reference to the conversations had, for the reason that the testimony is in no wise binding upon the Butte & Superior Copper Company, Limited; and, further, it is in the nature of hearsay.

Q. You say, Mr. Hughes, that you went upon the Elm Orlu claim at that time and sampled it?

A. Yes, sir.

Q. Did you observe any workings upon the claim?

A. Yes, sir. We went down in the shaft there. I believe it was forty feet, anyhow, to the best of my knowledge.

Q. Forty feet deep?
A. Yes, sir.
Q. And you say that that was, you think, in the year following, in the year 1879?
196 A. I think so; either '79 or '80; now, I wouldn't be sure.
Q. Did you observe whether or not the others, Allen and Flynn and others did go ahead with that lease?
A. Yes, sir.
Q. Just state whether or not they operated under it there.
A. Operated on what?
Q. Whether they went ahead and worked under that lease.
A. Yes, sir; they worked.
Q. Approximately how long?
A. I couldn't say how long.
Q. Did they remove any ore?
A. Yes, sir; they shipped ore.
Q. And that was taken from what claim?
A. From the Elm Orlu.
Q. Mr. Hughes, during the time that you were leasing there, were you around in that neighborhood?
A. Yes, sir.
Q. How often?
A. Oh, I couldn't say how often; I think I was over there twice anyway, once or twice.
Q. Will you state whether or not, at that time, the Elm Orlu claim was a well-known and well-recognized claim in that vicinity among the prospectors and the miners?
A. Yes, I believe it was.

197 Mr. Gray: That is all.
Mr. Kremer: No cross-examination.

(Mr. Gray then read the deposition of Patrick H. Meagher as follows:)

Deposition of Patrick H. Meagher for the Plaintiff.

PATRICK H. MEAGHER, a witness produced by the petitioners, being first duly sworn, testified as follows:

Direct examination.

By Mr. Gray:

Q. Will you state your name and residence?
A. My name is Patrick H. Meagher. I live at Race Track. My post office is Deer Lodge, Powell County.
Q. What business are you engaged in now?
A. I am farming now.
Q. You have a farm of your own?
A. Yes, sir.
Q. How large a farm?

A. Well, I have got eleven hundred and some odd acres.
Q. How long have you lived at your present home?
A. I lived down there 26 years—25 years—26.
Q. Prior to that, where did you live?
A. I lived in Butte prior to that, a few years.
Q. And what business did you follow while you were living in Butte?
A. Mining.
Q. Mining in what way?
A. Well, prospecting most of the time.
198 Q. When did you first come to Butte?
A. Well, I had been in Butte a long time ago, but the last time I come from Nevada in '76.
Q. You had been here before that, had you, and gone away?
A. Oh, I had been here long before that; I had gone away; I didn't know much about the country then.
Q. Upon your return in 1876, what did you do?
A. Well, I worked. I was looking for mines, over the hill there, and prospecting around; and then I went to Philipsburg and stayed two or three months, in '76, in Philipsburg—I don't know how long I did stay there.
Q. Are you acquainted with a lode mining claim known as the Elm Orlu?

Mr. Kremer: We object to the question and to all similar questions going to prove occupancy or possession by the Clark-Montana Realty Company, or its predecessors in interest, or by the Elm Orlu Mining Company, or its predecessors in interest, at the time in question, for the reason that, if it is sought to prove title by occupancy or possession, it is incompetent, irrelevant and immaterial, for the reason that it does not appear that any title is claimed, or has ever been claimed, by the said Clark-Montana Realty Company or the Elm Orlu Mining Company, or their predecessors in interest, by reason of occupancy or possession; and no such claim can be made, in view of the fact that it does not appear that the basis of the title of said companies, or their predecessors in interest, de-
199 pends or rests upon occupancy or possession, it appearing from public records that the claim is otherwise and rests upon a location notice; and for the reasons stated in the first objection here interposed. That same stipulation may be made, I assume—that this objection may go to all this character of testimony, without repetition?

Mr. Gray: Yes.

A. Yes, sir; I know where it is, yes.
Q. When did you first see or know of the Elm Orlu lode mining claim?
A. Well, in '76, "Jeff" McNamee claimed it—"Jeff," they called him; I didn't know his name then.

Mr. Kremer: I move to strike out the answer, as not responsive, and merely setting forth the claim of McNamee.

Q. Were you ever over the ground during that year, 1876?

Mr. Kremer: We renew the objection.

A. I was up through there, looking for ground, and I supposed it was all taken up then; I didn't notice it very much then.
Q. Did you see this claim that McNamee claimed at that time.
A. Yes, sir; I seen the ground.
Q. Did you observe the discovery upon that ground at that time?

Mr. Kremer: It is understood that the stipulation goes to all this testimony.

A. You couldn't read the notices: there was a good many
200 holes up through there then; I didn't notice very much in '76.
Q. Were you over that ground subsequently?
A. Yes, sir; in '77, I was over that ground.
Q. Did you see the El- Orlu claim at that time?
A. Yes, sir; in '77.
Q. Did you see the discovery upon the claim?
A. Yes, sir; they had a discovery there, what they called a discovery; I don't know whether it was or not; they told me it was.
Q. Who, McNamee?
A. McNamee, yes, sir.
Q. Did you observe the discovery shaft, or was there any work at the discovery?
A. Well, they had two or three holes there, and had kind of a little shack built there, on the side of the hill there, as you go up out of the Black Rock; and I was one of the locators of the Tuolumne—not Tuolumne (I located the Tuolumne, too), but the Pilot; I located the Pilot.
Q. The Pilot was situated where, with reference to the Elm Orlu?
A. It was south.
Q. Did it adjoin the Elm Orlu?
A. Well, I staked over on the Elm Orlu; when I took up the claim, I staked it over there; and, when I surveyed it, McNamee come there and showed me where his claim was, and I had to pull the stakes in.

201 Mr. Kremer: We move to strike out the testimony of the witness with reference to what occurred between the witness and McNamee.

Q. How soon after you located it did you have it surveyed; was it the same year?
A. Yes, sir; the same year I had it surveyed.
Q. The same year you located?
A. Yes, sir; but I couldn't tell the date.
Q. Who was it surveyed it for you
A. Baker, I think it was Baker.
Q. He was a surveyor here at that time.
A. Yes, sir. He done all the work for me.

Q. At that time did you go up and see the workings on the Elm Orlu?

A. Yes, sir; they were working over there. I don't know who was working; I didn't go over to the claim at the time I run the line.

Q. Did you ever see McNamee on the claim during that time?

A. Yes, sir; I seen him there a few times. I wouldn't know what date; I wouldn't remember the date—didn't keep dates.

Q. Did you see men working there during that year?

A. Yes, sir; I seen some fellows working there.

Q. What year?

A. Well, they were working there then, when I surveyed it.

Q. What year was that, the year you located the Pilot?

202 A. Yes, sir; I think it was in '79; it was '80 when I surveyed it, or in that fall, '79.

Q. Do you know William Parks?

A. Yes, sir.

Q. Did you ever see him on the ground there?

A. I seen him all over the country.

Q. Did you ever see him up on that ground?

A. Yes, sir; he was pecking around. I couldn't remember every place I seen him.

Q. Mr. Meagher, at that time, during those years, was the Elm Orlu claim a well-known claim among miners and prospectors in that vicinity?

A. Well, if I didn't think I had a good location, I would never have moved in; I wouldn't take in my corners for them.

Q. But generally, among others, and among prospectors generally?

A. Yes, sir; I never heard any dispute about it; there might be; but I never heard it.

Q. Did you ever go over to the shaft of the workings on the Elm Orlu in those early years?

A. Well, I did before that.

Q. How large were those workings at that time?

A. Well, they had two or three holes along on the mountain; they had one down to the lower end and one to the upper end; and there was a shaft there. I don't know how deep it was; I didn't measure it—fifteen or twenty feet, I don't know; I didn't take much notice of anything; it didn't interest me much.

203 Q. You were looking around for ground that was open for location, were you?

A. That's what I was looking for, yes; I was prospecting.

Mr. Gray: You may inquire.

Mr. Kremer: That is all; no cross-examination.

(Signed) PATRICK H. MEAGHER.

Subscribed and sworn to before me this 19th day of December, 1913.

(Signed) FRANK L. RILEY,
[SEAL.] *Notary Public for the State of Montana.*

Residing at Butte, Montana.

My commission expires February 13, 1916.

(Thereupon Mr. Gray read the deposition of Charles S. Warren as follows:)

Deposition of Charles S. Warren for the Plaintiff.

CHARLES S. WARREN, a witness produced by the petitioners herein, being first duly sworn, testified as follows:

Direct examination.

By Mr. Gray:

Q. Will you state you- name and residence?
A. Charles S. Warren; Butte, Montana.
Q. How long have you lived in Butte?
A. More or less of the time for 45 years.
204 Q. Did you ever know a claim known as the Black Rock claim?
A. Yes, sir.
Q. Did you know any of the locators of that claim?
A. Yes, sir; all of them.
Q. Who actually located the claim?
A. John C. Belk, my partner.

Mr. Kremer: We object to this, for the reason that it is entirely beyond the purview of the petition here filed, upon which the order was based under which this testimony is being taken.

Mr. Gray: It is simply for the purpose, Mr. Kremer, of showing how the General came to be acquainted with the Elm Orlu; it is preliminary.

Q. What, if any, official position were you holding in the fall of 1875?
A. I was sheriff of Deer Lodge County.
Q. You said that Mr. Belk was your partner?
A. Yes, sir.
Q. Was he your partner in any way in the location of the Black Rock?
A. I was the only "under the blanket partner" of Mr. Belk, and he located the Black Rock, the West Alex Scott, and the Anna Maria. Afterwards, Mr. Meagher came along and jumped it from us and called it the Gagnon, and beat us out of it in a lawsuit. And some other claims that I don't remember now. While my name didn't

appear, I was a full partner of Mr. Belk, and he afterwards
205 deeded these interests that I have mentioned.

Q. Are you, or have you, been acquainted with a claim known as the Elm Orlu?

Mr. Kremer: We object to the question and to all similar questions going to prove occupancy or possession by the Clark-Montana Realty Company, or its predecessors in interest, or by the Elm Orlu Mining Company, or its predecessors in interest, at the time in question, for the reason that, if it is sought to prove title by occupancy or possession, it is incompetent, irrelevant and immaterial, for the reason that it does not appear that any title is claimed, or has ever been claimed, by the said Clark-Montana Realty Company or the Elm Orlu Mining Company, or their predecessors in interest, by reason of occupancy or possession; and no such claim can be made, in view of the fact that it does not appear that the basis of the title of said companies, or their predecessors in interest, depends or rests upon occupancy or possession, it appearing from public records that the claim is otherwise and rests upon a location notice; and for the reasons stated in the first objection here interposed. That same stipulation may be made, I assume—that this objection may go to all this character of testimony, without repetition?

Mr. Gray: Yes.

A. Yes, sir.

Q. General, what year did you first see the Elm Orlu claim?
206 A. 1875.

Q. Will you just state the occasion of your seeing it?

A. Belk had made a discovery of a claim called the Black Rock. I happened to be up here from Deer Lodge, the County seat, and met him in town, and he asked me to go over with him and see the Black Rock claim, that he had located; and, in going across over there, we passed the Elm Orlu claim, and he told me that that claim belonged to "Jeff" McNamee and Savage and Burkett.

Q. That was in the fall of——

A. 1875.

Q. Did you go to the discovery of the Elm Orlu at that time?

A. We passed by it and broke up some of the rock and looked at it.

Q. What was the character of the rock?

A. I don't know the character of the rock, as, at that time we were all ignorant as mules about any kind of ore except gold ore or copper ore.

Q. Did you observe any shaft or opening at the discovery?

A. There was a discovery hole there.

Q. How large was it?

A. Possibly ten feet deep.

Q. Were you familiar with the size of discoveries required for the location of mining claims?

A. Didn't require any size, only required you to knock
207 off a chunk of ore and set up your stakes.

Q. There was an opening there eight or ten feet deep?

A. Yes, sir.

Q. Did you subsequently see that claim, in other years?

A. After my term of office was out, in December, 1875—I was up here once or twice during the year, and, on the 1st of March, 1876, I moved here permanently from Deer Lodge, and have resided here a greater portion of the time since.

Q. During the year 1876, did you see the Elm Orlu claim?

A. Yes, sir; very frequently.

Q. Did you ever see anyone on the claim?

A. I seen Mr. McNamee there.

Q. Did you ever see anyone working it?

A. Yes, sir.

Q. How much work, approximately, if you know, was done on that claim that year?

A. More than one hundred dollars. I know that for this reason; that there were forty men waiting around, looking for an opportunity to jump, as they would have had we not represented the Black Rock—they would have jumped the claim. I judge that from actual knowledge.

Q. In the next year, 1877, did you see anyone up there?

A. Yes, sir.

208 Q. Who?

A. I don't remember.

Q. There was work done upon it during that year?

A. Yes, sir. That was the best known claim there was over on the east side, except the Poser. The Poser and Black Rock were supposed to be the pioneer claims of that place.

Q. The Poser and Black Rock?

A. Or the Poser and Elm Orlu.

Q. Now, in the year 1877, can you say how much work was done on that claim?

A. Certainly more than one hundred dollars.

Q. How about the year 1878?

A. 1878. By that time, the Black Rock had got to be a pretty well known claim, shown up by the development made in representing it, and so forth; and I swear positively there was more than one hundred dollars' worth of work done that year, too.

Q. On the Elm Orlu?

A. Yes, sir.

Q. And, in the year 1879, do you remember seeing anyone working there?

A. Well, I used to see them every year, for the reason that I had a saddle horse and rode all over this camp at least once a week, in any kind of decent weather, and sometimes when the weather wasn't decent. I think, during those four years, I must have been interested in at least one hundred claims that were located in this camp.

209 Q. You were observing the work that was done on adjoining claims?

A. It was part of my business.
Q. You lived in Butte at that time?
A. Yes, sir.
Q. In going to the Black Rock claim, did you pass by the Elm Orlu?
A. As a rule, yes, that was the way to go; that is, over across the country—go up to the head of this Town Gulch and over across.
Q. Did you ever see any stakes there?
A. I only remember positively of the northeast corner stake of the Elm Orlu, and the reason I know that so well it was in conflict with our claim called the Black Rock. Of course the Elm Orlu was the first claim located—before the Block Rock.

Mr. Kremer: We move to strike out the statement of the witness as volunteered and not responsive, and entirely beyond the purview of the order in this case.
Mr. Gray: You may inquire.

Cross-examination.

By Mr. Kremer:

Q. You and Belk were partners in 1875?
A. Yes, sir.
Q. And Belk had located the Black Rock?
A. Yes, sir.
Q. And you were interested in the Black Rock?
210 A. Not only in the Black Rock—yes. I sold my interest for six thousand dollars to H. S. Clark in the Black Rock.
Q. Did Belk continue in the Black Rock with his associates.
A. I think he sold out after I did; he may have sold out before, however. He left this country some years ago.
Q. In 1875 the location was made?
A. In 1875 the location was made.
Q. You went up in 1876 on the Block Rock.
A. I went up in 1875 on the Black Rock, within five days after he had made the discovery.
Q. Then, in 1876 you were up there?
A. Yes, sir, frequently.
Q. Were they working there then?
A. Yes, sir.
Q. Belk still interested?
A. Belk was still interested then.
Q. And he was one of the original locators?
A. Yes, sir. I think he done the work himself, making the location, and located the Clarks in.
Q. And, in 1876 the Clarks and Belk——
A. No, he staked them in.
Q. I assume by that you mean he located the claim and declared them in—put their names in there?
A. Yes, sir.

Q. And, in 1876, you went up there, to see the workings on the Black Rock?

211 A. Not specially; I was looking around, like the rest of them were, to see what could be "grabbed."

Q. Well, you had already "grabbed" the Black Rock?

A. Well, I had "grabbed" some more around there.

Q. Well, you had "grabbed" the Black Rock?

A. Belk "grabbed" it. The way this occurred—this is not to go into the testimony here—I will tell you——

Mr. Gray: No, don't do it, please. Wait until we get through with the testimony.

A. (Continuing:) —tell you how we came to be partners.

Q. In 1876, you were up there with Belk?

A. Yes, sir.

Q. And in 1877?

A. Yes, sir.

Q. And in 1878.

A. And '79 and '80.

Q. And Belk was still there, doing work, all the time?

A. No, I don't remember what year he left there. After a while, after the claim became valuable, the Clarks took charge of it.

Q. They operated all the time from 1875 to 1878, mining silver?

A. Who, the Clarks?

Q. Yes?

212 A. The claim became valuable, and the Clarks took charge of it and attended to the representation, and notified us how much we owed for the representing.

Q. And it was represented all along and went to patent?

A. Yes, sir.

Q. By the same people?

A. Yes, sir.

Q. Was Belk interested in the Elm Orlu?

A. No, sir, I don't think so.

Q. Well, you would have known—he was your partner?

A. Yes, sir, I would have known, or he wouldn't have been so anxious about that northeast corner stake.

Q. Was Belk one of the original locators of the Elm Orlu?

A. No, sir.

Q. Who is this man Burkett to whom you refer?

A. I. C. Burkett. He used to be a Democratic member of the legislature from Indiana, and he died many years ago.

Redirect examination.

By Mr. Gray:

Q. Did you ever see Mr. Parks up there on the ground?

A. I don't believe I ever met Mr. Parks up there.

213 *Testimony of M. H. McNulty for the Plaintiff.*

M. H. McNULTY, a witness produced by the petitioners herein, being first duly sworn, testified as follows:

Direct examination.

By Mr. Gray:

Q. Just state your name and residence, Mr. McNulty?
A. My name is M. H. McNulty, or, in other words, Michael Henry McNulty, 103 South Ohio Street, Butte city.
Q. How long have you lived in Butte?
A. Well, I come in here on the 20th day of September, '79, I think that I would be here going on thirty-six years, or approximately that—going on that.
Q. What business have you followed in that time?
A. Pretty much mining and prospecting.
Q. Are you, or have you been at any time, acquainted with a mining claim known as the Elm Orlu?

Mr. Kremer: We object to the question and to all similar questions going to prove occupancy or possession by the Clark-Montana Realty Company, or its predecessors in interest, or by the Elm Orlu Mining Company, or its predecessors in interest, at the time in question, for the reason that, if it is sought to prove title by occupancy or possession, it is incompetent, irrelevant and immaterial, for the reason that it does not appear that any title is claimed, or has ever been claimed, by the said Clark-Montana Realty Company or
214 the Elm Orlu Mining Company, or their predecessors in interest, by reason of occupancy or possession; and no such claim can be made, in view of the fact that it does not appear that the basis of the title of said companies, or their predecessors in interest, depends or rests upon occupancy or possession, it appearing from public records that the claim is otherwise and rests upon a location notice; and for the reasons stated in the first objection here interposed. That same stipulation may be made, I assume—that this objection may go to all this character of testimony, without repetition?
Mr. Gray: Yes.

A. Yes, sir; I knowed of it.
Q. When were you first acquainted with that claim?
A. In the month of October of '79, I was out there and down in a shaft that was there.
Q. How deep was that shaft at that time?
A. Well, I think it was at least forty feet; it was all of that, I think.
Q. Did you see anyone upon the claim then?
A. I seen three men down in the shaft and one man on surface; there was four men working there. I seen a horse and a "whip" or a whim; I think it was a "whip;" I wouldn't be sure now whether it

was one or the other, but there was a horse there, and a man attending to him, and either a "whip" or whim, or something like that. It was anyhow by horse power that the ore was hoisted.

215 Q. Did you know any of those men then or thereafter?

A. I knowed all of them, all four of them.

Q. Who were they?

A. There was Peter Allen, there was Pat Flynn, John Carney, and Tim Harrington; those were the four men that were there.

Q. Did you observe what they were taking out of the shaft?

A. Well, they were taking out ore. I don't know what grade it was, any more than their saying something about it.

Q. I don't care for that. What was done with that ore, if you know?

A. Well, it was shipped to some of those—I know that the Dexter Mill was working then; it was either shipped there or to Williams' smelter; it was working then.

Q. How long did they continue to work there?

A. Well, they worked there quite a while.

Q. About how long?

A. I couldn't swear; I think they worked there seven or eight months, or maybe more, maybe a year; maybe they finished their lease; I couldn't say, you know.

Q. Now, were you acquainted with that claim during the succeeding year, 1880?

A. Oh, yes; I never lost cases on that claim; ever since

216 then I always knowed of its existence there; I never forgot the name of it.

Q. Did you know a man by the name of Michael McNamee?

A. Yes, sir; very well.

Q. Did you ever see him up there on the ground?

A. I probably did, once or twice; once, I think; I am sure of once, but I don't know whether I seen him twice there or not.

Q. Was that during the time that that lease was being operated that you spoke of?

A. No, it was afterwards, I think; still, maybe the lease was going yet, but it was afterwards, some time after, after that. He was a pretty busy man. I think he had somebody taking care of it, or left it in somebody's charge, or something, and, I think, at that time, he went to Ireland, or some place around in that neighborhood.

Mr. Kremer: We move to strike out the answer as based upon the supposition of the witness.

Mr. Gray: Well, I have no objection to that.

Q. Was the Elm Orlu claim, during the years 1879 and 1880, a well-known claim in that vicinity among prospectors and miners?

A. Well, yes, it was one of those claims that was prospected on; it was a kind of landmark, and, of course, most all the parties around there knowed just about where it was.

217 Mr. Gray: That is all.

Mr. Kremer: No cross-examination.

Testimony of John O'Donnell for the Plaintiff.

JOHN O'DONNELL, after being duly sworn as a witness for plaintiff, testified as follows:

Direct examination.

By Mr. Gray:

Q. State your name and residence?
A. You will have to speak louder; I am pretty hard of hearing.
Q. State your name?
A. My name is John O'Donnell.
Q. Where do you live?
A. In Walkerville, up here.
Q. What is your business?
A. My business is mining.
Q. How long have you been following that?
A. Oh, about 40 years; in the neighborhood of 40 years.
Q. How long have you lived in Butte, or near Butte, in this camp?
A. Thirty-eight years, or around there.
Q. When did you first come here?
A. I first came in here to Butte in 1878.
Q. Were you acquainted with the claim known as the Elm Orlu?
A. Yes, sir.
218 Q. When did you first become acquainted with that claim?
A. I became acquainted with it in 1878 in the fall.
Q. Did you know any of the owners of it at that time?
A. Mr. McNamee.
Q. What was his first name?
A. Jeff; Jeff McNamee.
Q. How did you come to see the Elm Orlu first?
A. Well, I guess it was whatever name he thought about locating it under.
Q. How did you go to see it first?
A. Because I was there on the ground with the gentleman that located it.
Q. That is the man you speak of, McNamee?
A. Yes, sir.
Q. Did you go to the discovery of the claim?
A. I have, yes, sir.
Q. How did you know it was the discovery?
A. Well, I should judge it was about——
Q. How did you know it was the discovery?
A. He told me it was the discovery.

Mr. Kremer: We object to that as immaterial and incompetent, hearsay, what he told him.

The Court: If it was on the ground at the time, it would be proper. The objection will be overruled.

(Defendant excepted.)

Q. What did you see at the discovery?

A. I saw black manganese ore there and one well defined
219 wall, and everything looked natural to me.

Q. What course was the vein?

A. East and west.

Q. Was there anything else upon the claim that you saw there, other than the discovery?

A. There was several little holes dug around, proving up the vein.

Q. Were there any croppings of the vein upon the claim?

A. Yes, sir.

Q. Which direction from the discovery?

A. West of it.

Q. Now, was there anyone working on the claim at that time?

A. Well, not just exactly at that time that me and Mr. McNamee was there; there was nobody there then.

Q. Did you see it again subsequently—later on?

A. Later on I have, yes, sir.

Q. Did you see anybody working on it?

A. I have, yes, sir.

Q. Who were the first people you saw working on it after you and McNamee first went up there?

A. Why, I seen a gentleman by the name of Flynn.

Q. Do you remember when that was, what year?

A. That I couldn't state exactly, to tell what year; I think it was around 1791 or '92, around in that neighborhood somewhere.

Mr. Dickson: He means 1891 or '2.

220 Mr. Gray: Yes.

Q. How long was it after you first saw the claim with McNamee that you saw Flynn working there?

A. It was about three years later.

Q. That was Pat Flynn, was it?

A. Yes, Pat Flynn.

Q. Now, where was he working at that time?

A. He was working where the dump of the Elm Orlu is now.

Q. Whereabouts, in what kind of working?

A. He was sinking; he had a windlass on it and was sinking a shaft there.

Q. Did you go down in the shaft?

A. I did; yes, sir.

Q. What did you see there?

A. Well, he was prospecting, the same as any prospector would.

Q. What did you see in the shaft?

A. I saw black manganese ore there and a pretty good looking vein; it looked good in those days, all right.

Q. Where was that shaft from the discovery?

A. Well, I should judge it was about 70 or 80 feet from where Mr. McNamee showed me the hole the discovery was in.

Q. In which direction?

A. It was right on the south side; a little bit south of the discovery.

221 Q. Did you at that time follow the outcrop on that claim, ont any other claim?

A. Yes, I followed it close to the Alice mine up here in Walkerville.

Q. Followed it from where to where?

A. Followed it from the Elm Orlu up to Walkerville, to the Alice.

Q. How did you happen to follow it over there?

A. Well, me and Mr. McNamee was walking around together, and we used to go over the ground together and see the ground.

Q. Did he have any other claim over there that he went to?

A. Well, he was interested, he told me, in a fraction that Mr. Clark bought.

Q. Where was that fraction?

A. Clark's fraction, it is called; it is up north of Walkerville.

Q. What was that vein known as or called at that time?

A. It was called the Rainbow.

Q. Did you know a man by the name of Billy Whiteman?

A. Yes, sir.

Q. Did you ever see him up on the Elm Orlu?

A. I have, yes, sir.

Q. When?

A. Well, the date I could not give; it might have been two years later than when I saw the discovery.

222 Q. It was along in that time?

A. Yes, along in that time.

Cross-examination.

By Mr. Kremer:

Q. Who sunk this shaft you say was 80 or 90 feet south of the one that McNamee pointed out to you as the discovery?

A. A gentleman by the name of Pat Flynn.

Q. How deep did he sink that shaft?

A. Well, as far as my judgment would go—I did not measure the depth.

Q. Well, approximately?

A. I went down in the bucket and a windlass; he had a windlass to go down with; and I went down about 50 feet, I should judge.

Q. Did Flynn tell you then that he had sunk that shaft?

A. Yes, sir.

Q. Now, you say that you were up in the claim in 1878?

A. Yes, in the fall of 1878.

Q. And you were with McNamee, who was then an owner?

A. Yes, sir.

Q. And he pointed out a place that you say he told you was the discovery?

A. That is what he did.

Q. How much of a hole was that?

223 A. Oh, I should judge it was about—there was some stuff in the bottom of the hole, but I should say over the bottom of

the hole was over ten feet, I should think anyway. I did not measure it at all, but it was ten feet.

Q. Then where was the shaft at that time; was there a shaft on there at that time?

A. There was no shaft on it at that time.

Q. There were some other workings on it at that time, weren't there? Quite extensive workings?

A. There was nobody working in that district in those days at all that I could see, only this Elm Orlu.

Q. There was nothing upon the Elm Orlu in 1878, when you went there with McNamee, except where there was a discovery ten feet deep, and then a little cut on the surface?

A. It might have been fourteen feet deep as far as I know, because there was a whole lot of stuff that caved in.

Q. Now, what other working was there there at that time?

A. I don't know anything more about it, any more than what I am just telling you.

Q. I know, Mr. O'Donnell, but I want you to tax your recollection to the utmost, if you will, and now tell us what other workings or what other opening there was on the Elm Orlu in 1878, when you were there with McNamee, besides that discovery that McNamee said:

"Dennis, this is my discovery?"

224 A. There was a few holes to prove up the hole, right along the lode, running west of there.

Q. How deep were those holes?

A. Well, the bank of them caved in since they were dug. The frost, you know, comes in the winter time, and the banks caved in when the thaw comes in the spring of the year.

Q. Tell us what the condition was?

A. Well, they looked as if they were prospect holes, anyway, to me, and Mr. McNamee told me that he thought it was a pretty good vein.

Q. He did not know much about it then either?

A. Well, it is not——

Q. There had not been very much work done then?

A. No; those days we did not know as much as what people know now about it.

Q. The first real work that was done on that claim was when Flynn went to work there, wasn't it, the first real mining.

A. Well, I think the first real work that was done there in depth was that Flynn went down deep—as far as I know.

(Witness excused.)

Mr. Gray: I offer in evidence a certified copy of the location notice of the Poser Mining Claim, for the purpose of showing by a location made on or about the 1st of May, 1875, that the locator of the Poser Claim recognized the Elm Orlu as a well-known claim and tied their claim to the west boundary to the Elm Orlu, for

225 the purpose of showing that it was a claim marked and staked upon the ground at that time, so that it could be seen and known.

Mr. Dickson: We object to it as irrelevant, immaterial and incompetent, that it has no bearing upon any issue in this case; and if it is offered for the purpose of tending to carry the patent back by relation to a date anterior to the date of final entry, we object to it as incompetent and irrelevant.

The Court: I doubt whether it is competent, but at this time the objection will be overruled proforma, and you may have an exception. If it is not entitled to consideration the court will disregard it when it comes to making up its decision.

(Defendants excepted.)

Location notice of the Poser Mining Claim admitted in evidence and marked Plaintiff's Exhibit No. 1.

Mr. Gray: Before proceeding, Judge Dickson, I understand that our surveyors have compared the map, and each has furnished the other with notes of his survey and there is no dispute as to the outlines of the claims or the workings therein, both surface and underground. If that is true it would save the necessity of calling the surveyors to testify to it.

Mr. Dickson: I am not sure whether they agree as to all the surface and underground workings.

Mr. Gray: I am advised that as to the Elm Orlu the surveys were made and notes furnished by our engineers and surveyors
226 and we accepted yours of the Black Rock.

Mr. Kremer: They have checked this map, you mean?

Mr. Gray: They checked it on a forty scale and we have enlarged it to a twenty scale.

Mr. Kremer: We can later determine whether or not there has been such an agreement and take up any disagreements.

Mr. Dickson: I understand notes of the surveyors were exchanged, but whether all the workings are shown on the map I am not advised.

Testimony of Joseph C. Pyle for the Plaintiff.

JOSEPH C. PYLE, called as a witness on behalf of the plaintiff, being first duly sworn, testified as follows:

Direct examination.

By Mr. Gray:

Q. Will you state your name, residence and occupation?

A. Joseph C. Pyle; residence, Butte; and occupation is mining engineer.

Q. How long have you resided in Butte, Mr. Pyle?

A. Seventeen years.

Q. Are you acquainted with the Elm Orlu and Black Rock mining claims?

A. I am.

227 Q. Will you state how you came to be acquainted with the Elm Orlu?

A. I have been in the employ of Senator Clark during the past seventeen years in the capacity of consulting engineer. I was aware that the Senator was the owner of the Elm Orlu claim and interested in the Poser and Black Rock, and it was part of my duties to inform myself of the properties in which he was interested and to keep some track of any work that was being done upon any of them in Silver Bow County or in Montana for that matter.

Q. Do you first recollect when you were upon the Elm Orlu; what year?

A. It was in 1905.

Q. Will you state what, if any, developments or openings were accessible to you at that time; that is, its condition?

A. In reference to the Elm Orlu claim?

Q. Yes.

A. There were no openings accessible. A shaft, that from the appearance of the dump that might have been over two hundred, possibly three hundred feet deep, it showed—there still remained the foundation of a hoist engine; there were some portions of a caved stope that could be seen and that is all I recall in the way of workings on the ground at that time.

Q. How did you happen to examine the claim at that time, Mr. Pyle?

228 The Court: If he is to describe the workings—is that what you desire?

Mr. Gray: No, the workings he says are—I asked him how he happened to be upon the ground.

The Court: I would push along to something material. I don't see how—I don't see that it makes any difference how he got there.

Mr. Gray: Was there any outcrop of a vein shown there that is not now visible?

A. There was a very large outcropping, quartz manganese ore, around that old shaft.

Q. Is that visible now?

A. No, the greater part of that has been covered by the dump of the new shaft.

Q. Now, will you just state how this property was developed, the history of its development; you also saw the Black Rock, did you, about the same time?

A. I was in the Black Rock mine shortly after it had been unwatered to the depth of, I think, four hundred feet. I examined what workings were at that time accessible, and shortly after when the shaft had been sunk to the depth of five hundred feet and work done, I again visited Black Rock and saw what the new work disclosed.

Q. Had there been any stoping of any of these levels from the Black Rock that you saw at that time?

A. There was some stoping being done at that time.

Q. On what level?

A. I think it was between——

229 Mr. Dickson: I think it would be very much more satisfactory, Mr. Gray, if you would have the map showing the work, to which the witness refers. I don't know what he is talking about.

Mr. Gray: I am very sorry, but that map is not available right now. There is some additional work being put on it. I am only calling Mr. Pyle to testify to these things since it became accessible.

Mr. Dickson: I would like to have that located.

The Court: Proceed.

Mr. Dickson: We may wish to interrogate——

The Court: Let the witness proceed. You will have your opportunity to cross-examine him a little later.

Mr. Gray:

Q. What level was that?

A. Between the three hundred level and what is known as the Niagara tunnel. Some stoping was being done by lessees and a cross-cut had been driven from the four hundred level and a raise put up to just below the same stope that I had first seen working between the Niagara tunnel and the three hundred.

Q. You also said you saw the five hundred when that was opened up?

A. Yes, sir.

Q. Now, Mr. Pyle, with reference to the development of the Elm Orlu, how was that developed?

A. Do I understand you want a history of all that I have done on that ground?

Q. Yes.

230 A. Leading up to the development of the Elm Orlu mine?

Q. Yes, just briefly, how you opened it up?

A. In reference to that, directly in 1905 I had the privilege of examining the mines of the Speculator Company——

The Court: If you will keep to the Elm Orlu we will have all we want to attend to in this case. Come to this mine. Answer his questions in relation to that.

Mr. Gray: All right, just how it was developed, by shaft or tunnel?

A. Well, I located the shaft that is now the main working shaft of the Elm Orlu at the point where it appears on that map. The shaft was sunk to a depth of seven hundred feet and crosscuts were run, one to the five hundred and seven hundred levels, to the north, cross cutting the Rainbow lode, the top of which I had seen under the present dump of that shaft.

Q. Here is a shaft (indicating) on the large map?

A. Yes.

Q. Was there any ore mined from either of these levels, and if so, what was done in the way of mining and further development?

A. Above the five hundred level we stoped to the height of about seven floors and extracted several cars of silver ore.

Q. Is that opened now?

A. That is closed.

Q. Caved?

231 A. Caved in.

Q. What is the fact as to the vein being in the back where you ceased stoping near the seventh floor above the five hundred?

A. In back of that stope I run a short crosscut some ten feet to the south and there the vein was apparently at least fifteen feet and possibly wider in the back of that stope, seven floors above the five hundred foot level.

Q. Continuing on?

A. Yes.

Q. What was the general course of that vein that you worked on there?

A. About east and west, a little north of east.

Q. Now, what else did you do, say on the seven hundred?

A. On the seven hundred we crosscut the vein and drove both easterly and westerly, and later on opened up a stope in the body of zinc ore that was disclosed by that development and have since extracted all of the ore above that level.

Q. I have here a plat that I will not offer now; I will prove later—I simply desire Mr. Pyle to identify the work that he did there which is not closed up. I am showing you a plan of the seven hundred of the Elm Orlu, Mr. Pyle, plaintiff's Exhibit 2 for identification, will you indicate on here to what point on the seven hundred you developed that vein that you have spoken of?

232 A. Identifying the vein by this working from a point shown north of the shaft to the point where the crosscut penetrates the vein, where I am pointing now, the entire working on that seven hundred foot level.

Q. Well, it is called crosscut 709?

A. Yes, I see.

Q. Was it also developed on crosscuts 705 and 707?

A. It was.

Q. And what was character of material disclosed right at the north end of the crosscut 709?

A. A soft clay, very wet, caved in, and just south of it and in the crosscut for a distance of about forty feet there was—there is alternate stringers of manganese ore, manganese and quartz.

Q. Did that clay and material that you found there correspond with any similar material that you had followed or seen anywhere there; and whereabouts?

A. It corresponded with the material that we found on the northerly working at probably the seven hundred foot level. The clay material—what I took to be the wall of that vein—was from two to four or five feet thick.

Q. Is that accessible now?

A. Now that I think is closed.

Q. And how far from the end of this 709 crosscut southerly did you have this vein material?

A. About forty feet.

Q. And the 707 was practically all in the vein?

A. All in the vein.

233 Q. And 705, where was that?

A. Yes, that was all in the vein. I drove these crosscuts for the purpose of ascertaining both walls.

Q. Was that level mined at that time; did you mine any above that level at that time?

A. What time?

Q. Immediately after driving the 700 and before sinking the shaft in the five?

A. No.

Q. What was the history of the mine development; what did you next do?

A. Well, after having determined the character of the ore disclosed in the 700 level and the probable continuation of it, I had—I sank the shaft to the 1,000 foot level, drifted 200 feet east and crosscut the vein again.

Q. On what level was that?

A. The 1,000.

Q. Now, from that time—when did you start to mine that, Mr. Pyle; did you start to mine at that time?

A. That was in 1909; but in the meantime having exposed the ore body on the 1,000 pretty thoroughly, at least sufficiently to warrant the extraction of ore and the construction of a mill for the purpose of treating the ore, I went back and drove the eight and nine hundred levels and blocked out the same ore body that ha' been developed on the 700 and the 1,000. About the time that work was completed the mill was ready for operation. I think it was in 1909.

Q. And from that time on had you——

234 A. From that time we have been mining and shipping it.

Q. I understood you to say you were also familiar with the Black Rock, three, four and five hundred. Did you follow and examine and observe the development of the Black Rock mine?

A. Yes, I have visited the Black Rock mine for the purpose of inspecting the work there from time to time ever since the shaft was unwatered.

Q. What did you see in that 500 Black Rock, Mr. Pyle, when you went in there?

A. The drift northerly or northeasterly from the shaft disclosed the same large quartz manganese vein continuing, silver in certain chutes for a considerable distance along the drift. There was also a crosscut northerly and southerly.

Mr. Dickson: On what level you say?

A. It was on the 500 of the Black Rock. And an exposure of a large vein was made in the crosscut, not merchantable ore in any part of it, but I thought I readily recognized the Rainbow lode in that working.

Q. Now, Mr. Pyle, did you also see this vein disclosed in the Niagra tunnel?

A. I did.

Q. Is that accessible now, do you know?

A. I haven't been in it for some little time. It may be accessible now. I think it is.

Q. Now, following the 500, where did the Black Rock then sink their shaft to, what level?

235 A. The shaft was sunk to the 1,200 level before I saw it again. I think the work of sinking continued to the 1,200 foot level and the first extensive working was upon that level after the crosscut had been run on the 500.

Q. During the time that the 1,200 was being run, did you observe it frequently, go through the mine?

A. Well, from time to time, perhaps two or three or four times a year, something. I don't recall just how often. The work progressed slowly. I saw it developed perhaps every two or three or four hundred feet of new work.

Q. What was the occasion of your visiting there during that time, Mr. Pyle?

A. For the purpose of reporting the progress of the work to Senator Clark.

Q. Was that during the same period of time approximately that you were developing the Elm Orlu?

A. Yes. The whole 1,200 level of the Black Rock, running westerly, was about the same time that I was running the drift on the 1,000 eastward.

Q. In the Elm Orlu?

A. In the Elm Orlu.

Q. Do you recollect visiting the 1,200 at any time when it was being extended easterly from the shaft or examining the ground easterly from the shaft in the 1,200—in that connection I show you plaintiff's Exhibit 3 for identification which is a plan map

236 of the 1,200 Black Rock, scale 40 feet. Did you see that Black Rock 1,200 as it was being driven?

A. Yes, I watched the driving of the drift eastward and the opening of the sill floor south and eastward of the Black Rock shaft, as indicated here.

Q. Did you observe at any time a raise from the sill floor of the 1,200, going upward from the point some distance east of the shaft which is indicated by two squares between stations 54 and 88 on this Exhibit 3 for identification?

A. I did.

Q. Where did that start and when was it you observed it?

A. I think it was in the latter part of 1911 or '12. I went through that raise which started, I think, on the third or fourth floor of the Black Rock stope on that level.

Q. That is just east of crosscut 1,201?

A. About forty feet of crosscut 1,201.

Q. You say that raise started from one of the stopes, three or four floors above the 1,200 foot level?

A. Yes. At least the raise possibly was continuous down to the sill floor, but I went in there, into the raise, from the stope. I was

already in the stope, having gone in there from some other raise, and started from the third floor and followed that raise on up to the 1,000 foot level, of the Black Rock.

Q. Mr. Pyle, what was disclosed in that stope, on the sill
237 floor and at the bottom of that raise; what did you see there?

A. A large ore body, as indicated by the size of the workings shown upon the map.

Q. Had the ore been removed at that time?

A. It was being removed at that time, on the first, second and third floors, I think.

Q. Just state whether this raise followed up within the vein or outside the vein, which you saw going up, the raise of the 1,000?

A. The raise was carried up some three or four floors in the same large ore body and it was offset to the south and was continued up on a dip, that is a northerly dip, for a considerable distance.

Q. You say continued upward and to the north?

A. Upward and on a northerly dip. There was an offset to the south, in going up, and then the raise was an incline for part of the distance.

Q. Raising in what direction?

A. In the direction, towards the south as it went upward and near the—I would say approximately about the—perhaps eighth to tenth floor of the vein.

Mr. Dickson: Eight or ten floors above the 1,200?

A. Yes. The vein that was disclosed in that raise was wholly continuous or practically all continuous within the raise. The smaller vein that was being followed up was shown on that raise, continuing to a point where the raise was then brought up about six sets vertically to the level of the 1,000, at the point where
238 the raise was brought up vertically it left that vein and the raise was brought up in country rock.

Q. Left the vein on the south side of the raise?

A. Yes, left the vein on the south side of the raise.

Q. Did you take the dip of the south wall of that vein that was followed up, Mr. Pyle?

A. Well, the dip of that vein was coincident with the incline part of the raise, practically.

Q. And what was that?

A. It was about seventy degrees to the north, seventy to seventy-five degrees.

Q. What was the size of the vein where the raise left the vein and went vertically upward through the ground?

A. About five or six feet wide.

Q. Subsequently did any one go through that raise with you?

A. After—immediately after having gone through that raise I reported the situation there to Senator Clark and on his——

The Court: Who went through that raise with you afterwards?

A. Senator Clark.

Mr. Gray:

Q. Now, Mr. Pyle, did you take the dip of the walls along the twelve, east and west, during the time that the drifts were being extended?

A. I did.

Q. What was it?

A. The dips of both the north and south walls was to the
239 north and varied from fifty-five degrees to about seventy degrees.

Q. What?

A. To about seventy.

Q. And what direction?

A. Dipping constantly to the north.

Mr. Gray: Now, Judge Dickson, about the stopes beneath the surface of the Elm Orlu that were extended by the Butte and Superior Company is it agreed that we do not go into that now, as to the amount of ore extracted?

Mr. Dickson: Of course I understand that we will not go into the matter of an accounting now, because it may be that it will never be necessary.

Mr. Gray: Then there will be no need of going into the matter now at all. That is all.

Cross-examination.

By Mr. Dickson:

Q. Now, Mr. Pyle, can you indicate to the court on this general plan map that is on the board the most easterly workings within the surface boundaries of the Elm Orlu in 1905 when you first became connected with the property?

A. The most easterly workings on the surface of the Elm Orlu that I observed at that time is indicated at this point, by a working that is intended to represent an outcrop; it was about in there I think.

240 Q. Will you indicate that on the map; put a circle around it and designate it in some way?

A. I have marked it J. C. P., with an arrow pointing to it.

Q. What is the distance from the most easterly surface workings within the boundaries of the Elm Orlu in 1905 to the east end line of the claim?

A. Approximately 800 feet, I think.

Q. You were asked about a raise that had been started by the defendant company from four or five sets above the 1,200 foot level and carried upward to the 1,000 foot level?

A. Yes, sir.

Q. Did you say anything about that raise having been afterwards *been* carried further upward by the Clark-Montana Realty Company?

A. I said nothing about it, no.

Q. Since 1905, at any time since then and up to the time of the commencement of this lawsuit—you know when that was?

A. Yes.

Q. Had you the direction or supervision of any litigation work that was done within the surface boundaries of the Elm Orlu claim easterly of the point that you have indicated upon the map—I mean surface workings?

A. I directed the sinking of a shaft at that point.

Q. When was that done?

A. I think that was in 1913; possibly later.

241 Q. Can you indicate that on the map that is now on the board?

A. Yes, sir; it is on there; the shaft referred to is located at this point and is marked "East Shaft."

Q. Was that started before or after this suit was instituted or at that time?

A. Before.

Q. And in anticipation of litigation or in anticipation of contemplated litigation with the Butte-Superior?

Mr. Gray: That is objected to on the ground that it is immaterial.

(Objection sustained; defendant excepted.)

(Witness excused.)

Whereupon further hearing was adjourned until Tuesday, November 19th, 1915, at 10 o'clock A. M.

Tuesday, October 19, 1915—10 o'clock a. m.

Court convened pursuant to adjournment.

Testimony of Dave Kirby for the Plaintiff.

DAVE KIRBY, after being duly sworn as a witness for plaintiff, testified as follows:

Direct examination.

By Mr. Folsom:

Q. What is your name?

A. Dave Kirby.

Q. Where do you reside?

A. Rimini.

Q. When did you first come to Butte?

242 A. 1879.

Q. Are you familiar with the Elm Orlu claim in this district?

A. I worked on it.

Q. What years?

A. '79 or '80; I wouldn't be positive.

Q. What did you do on that property at that time; what did your work consist of?

A. I was working for Pat Flynn and a man by the name of John Kearney; I was foreman for them.

Q. Did you work on a mineral vein?

A. Yes, sir.

Q. What work did you do?

A. We were stoping ore.

Q. At what point with reference to the west boundary line of the Elm Orlu claim?

A. The west boundary line?

Q. The west end line; do you know where the shaft was?

A. Yes; we had two shafts there.

Q. What sort of shafts; how deep?

A. The first shaft, the furthest west, I should judge was about 30 feet deep or 35; and the one at the east was between 60 and 65 feet as near as I can remember.

Q. How long was the vein; for what length was the vein developed from those shafts?

A. That would be in the neighborhood of 100 feet.

Q. What was the direction of the vein as disclosed by those shafts?

243 A. East and west.

Q. What relation did Flynn and the other gentleman that you mentioned have with relation to the claim?

A. They were leasing there, and shipping the ore to the Colorado smelter.

Q. How long did you work on the property at that time as foreman?

A. Oh, it would be about five or six or seven weeks.

Q. Do you know where the discovery of the property was?

A. Well, the shaft on the west end was supposed to be the discovery.

Q. Why do you say "supposed to be?"

A. There was a notice there, or a portion of a notice, and it was known as the discovery by the fellows that worked there.

By the Court:

Q. A notice of what?

A. It looked like a notice of location, or a portion of one.

By Mr. Folsom:

Q. What was the direction of the vein in the property as disclosed at that time with reference to the lines of the claim?

A. Well, the direction of the vein was east and west.

Q. Did you know McNamee and Savage and Burkett?

A. I knew McNamees, two McNamees.

Q. Michael McNamee?

244 A. Jeff McNamee and Ed McNamee.

Q. At that time did you see McNamee upon the claim?

A. I saw Jeff McNamee upon the claim.

Q. Do you know where he is now?
A. No, I do not.
Q. He is the same person, is he not, who was known as Michael McNamee?
A. No, I never knew him, only as Jeff McNamee.

Cross-examination.

By Mr. Kremer:

Q. You knew both Joseph and Frank McNamee?
A. I didn't hear it.
Q. I say you knew both Joseph and Frank McNamee?
A. I knew Joseph and Ed McNamee.
Q. That was in 1879, I believe you say?
A. '79 or '80.
Q. You were employed as foreman?
A. For Pat Flynn and John Carney.
Q. Flynn was the man under whose direction the entire shaft, as you described it, was sunk?
A. I don't know. I wasn't there when they were sinking the shaft.
Q. You worked on that?
A. I was stoping there, stoping out ore.
Q. Now, with reference to this westerly shaft, you say that that was what was known as the discovery shaft?
245 A. That is what was known as the discovery shaft.
Q. And the reason you believed it was the discovery shaft was because you saw a notice posted upon it?
A. I always understood it that way, that was the discovery.
Q. Oh, no; tell us what you know of your own knowledge; what you saw there?
A. Well, I saw a board and apparently a location notice or a portion of one.
Q. You don't know what that purported to be, what claim or anything; did you read it?
A. No, I didn't read it.
Q. Did you look into that discovery so called?
A. Yes; I worked on it.
Q. Did you see a northwest vein there?
A. Northwest vein?
Q. Yes?
A. No, I saw just the one vein there.
Q. And you would say positively at this time that there was not a northwest vein on this discovery, would you; northwest and southeast vein?
A. I didn't see any but just the one place where we worked in there. One wall there to it.
Q. And at what depth were you working?
A. It would be about thirty or thirty-five feet in the west shaft.
Q. At what depth were you working in the other shaft, the Flynn shaft?

A. About sixty or sixty-five.
246 Q. How old are you, Mr. Kirby?
A. Sixty years old.

(Witness excused.)

Mr. Dickson: All of this testimony, of course, goes subject to our objection.
Mr. Folsom: Certainly, judge.

W. A. CLARK, called as a witness on behalf of the plaintiff, being first duly sworn, testified as follows:

Testimony of W. A. Clark for the Plaintiff.

Direct examination.

By Mr. Folsom:

Q. Senator Clark, when did you first come to this district?
A. I first came to this district in the early fall of '72; 1872.
Q. When did you first become familiar with the Rainbow lode?
A. My first visit to the Rainbow lode was in the month of January, 1873.
Q. By the way, was it known as the Rainbow lode at that time?
A. It was known as the Rainbow lode. I made a trip all the length of what was called the Rainbow lode.
Q. What was the condition of this vein with reference to its being easily followed at that time?
A. There were outcroppings, strong outcroppings, the
247 entire length of the vein as far as known at that time.
Q. When, if you know, were the first locations made on that lode?
A. On the Rainbow lode?
Q. Yes?
A. I can't tell when the first locations were made.
Q. When did you first become familiar with the Elm Orlu claim?
A. I first became familiar with the Elm Orlu in '76. I had been over the ground frequently, but I became rather interested in the lode at that time on account of the outcropping.
Q. On account of what?
A. On account of the outcropping and the character of the ore, although I was not interested financially in it at that time.
Q. When did you first acquire an interest in the Elm Orlu claim?
A. I acquired the first interest in 1885, I think it was in 1885—1884 or 1885.
Q. What did you do after you acquired an interest with reference to that property?
A. I acquired—after I acquired the first interest I didn't do anything. It was in the possession of a man by the name of Sigsby whom I think had a lease on it and hence I could not take any action

with regard to it, having only a minor interest, one-fourth interest which I acquired at that time from Mr. Lowe.

248 Q. When did you start to develop the Elm Orlu?

A. I began in 1886 to develop it. I had acquired the other interests in 1886.

Q. What work did you do; what development work did you do after acquiring the interest?

A. After acquiring the interest, all of the interest in the mine, I sunk a shaft on it, put a whim in after we got down a ways.

Q. And what year was that, do you remember?

A. That was in '86.

Q. What did you develop in that in the way of a vein?

A. I developed a good strong vein there.

Q. What was the course of that vein?

A. It was east and west.

Q. Did you extract any ore from it?

A. Yes, there was ore that came to the surface in some places, but the ground was in rather bad condition so I started a new shaft right in the vein, however.

Q. How deep did you work it at that time?

A. I worked it at that time and afterwards probably for a year and a half to the depth of about 300 feet.

Q. Did you find a vein all the way?

A. Continuous vein all the way.

Q. Ore in it all the way?

A. All the way.

Q. To what extent did you develop the vein easterly and westerly on its strike?

A. I drove easterly and westerly—I can't recall exactly the

249 distance, but I think something like 200 feet to the west, as far as the pay ore extended, and to the eastward I think about the same distance, probably not quite so far to the eastward.

Q. You say "pay ore." What do you mean by pay ore at that time?

A. Ore that we could mill at that time and make a profit from it.

Q. Were the conditions such at that time that you could work as low grade ore as you can now at a profit?

A. Well, the price of silver was fairly high at that time, I think about $1.10, and we could work ore that we couldn't work afterwards; and the low price of silver was the cause of a great many mines shutting down, and I think perhaps we were actuated by the same reason afterwards in closing the mine.

Q. I will ask you if you have been familiar with the Elm Orlu ever since that time, intimately familiar with it?

A. I have been.

Q. In the year 1912 did you have occasion to visit the property with Joe Pyle who testified yesterday, the Elm Orlu property, the Elm Orlu and Black Rock property?

A. In 1912?

Q. Yes.

A. Yes, I did.

Q. I will ask you if you at that time visited or passed
250 through a raise from the 1,200 level of the Black Rock?

A. I did.

Q. Described by Mr. Pyle yesterday.

A. Went up through the raise.

Q. What did that raise disclose?

A. It disclosed a pretty strong vein where we entered it on the 1,200 and if I recollect right they had stoped up a little ways, and then the raise was put up through the ten, or near the ten, in a fairly strong vein, weakening somewhat, that is lessening in size, as we went up.

Q. What was the condition of it at the top of the raise?

A. At the top of the raise—I might say that the raise in going up was offsetted to the south. The pitch of the vein at that point was to the north, and not far from the top of the raise, where we went, the raise departed from the incline, and was carried up perpendicularly for some distance.

Q. Was that in ore?

A. No, that was in granite at the head of it, at the top of it.

Cross-examination.

By Mr. Dickson:

Q. Were the croppings of the Elm Orlu prominent from the west end northeasterly—easterly and then northeasterly?

251 A. I did not understand.

Q. You spoke of prominent croppings of the Rainbow vein that could be readily traced on the surface?

A. Yes.

Q. Speaking of the vein in the Elm Orlu which crosses the west end line of the Elm Orlu and then departs over the northerly side line of the Elm Orlu into the Black Rock, were the croppings, when you first became acquainted with it, prominent throughout there?

A. Yes, the croppings were prominent; on the Black Rock more so than on the Elm Orlu.

Q. Senator, you understand that the Elm Orlu vein which crosses the west end line of the Elm Orlu claim departs over the northerly side line of that claim some five or six or seven hundred feet east of the west end line of the Elm Orlu?

A. Yes.

Q. And then traverses for some distance in a northeasterly direction the Black Rock claim?

A. Yes.

Q. When you first became acquainted with the Elm Orlu were the croppings of that vein prominent as you followed it across the side line of the Elm Orlu into the Black Rock?

A. The croppings of the Elm Orlu were prominent, but not so much so as the Black Rock. The croppings on the Black Rock were much more prominent than they were on the Elm Orlu.

Q. Well, I want to ask your attention to that portion of the vein—

that section or segment of the vein as you follow it across the
252 southerly side line of the Black Rock and the northerly side line of the Elm Orlu?

A. There were no croppings there between—right along where it crossed over that line—that is, they were not prominent, but above that, a little west of where it crosses the side line the croppings on the Elm Orlu were very prominent. They did not extend so high, and could not be seen for so great a distance as those on the Black Rock; nevertheless they were prominent on the surface.

Q. Now, traveling along there, in following the croppings on the surface across that boundary line between the Black Rock and the Elm Orlu—can you see them there?

A. Well, I cannot say that the croppings were prominent just where it crosses the line, because they seemed to be covered up right there.

Q. How near to that line, southerly of it, were the croppings prominent?

A. Oh, a very short distance.

Q. How near to that line and northerly from it were the croppings again prominent?

A. Oh, very near.

Q. You mean a few feet?

A. No; the croppings on the Black Rock as you went further east of the division line, they became more prominent, but where the vein crosses it was only a short distance.

Q. About what distance?

253 A. Well, I suppose one hundred or one hundred and fifty feet, until the croppings of the Black Rock again began to be more prominent. Right at the line they seemed to be covered over.

Q. In 1912, when you say you had occassion to visit the raise referred to in your direct examination, were you then interested in the Black Rock property?

A. I was, yes, sir.

Q. The raise as followed from the 700 upward toward and nearly to the 200 foot level——

A. From the 1,200 up to about the 1,000.

Q. From the 1,200 up to about the 1,000, it diminished in strength and size?

A. A little; not very much; it was a strong prominent vein all the way through, but it was larger at the bottom than it was at the top, a little wider.

Q. Was the entire width of the vein disclosed in the top of the raise as the raise then was?

A. Oh, I don't recall exactly; I should say the vein was three feet wide at the top.

Q. And how wide at the bottom?

A. I think it was about five feet.

Redirect examination.

By Mr. Folsom:

Q. Senator Clark, with reference to what time are you testifying, when you are testifying with reference to noticing the outcrop of the Elm Orlu and Black Rock as being prominent?

254 A. I was referring to the time when I first acquired it, before there was very much work done on it. Of course the conditions are vey much changed now, by breaking down and covering up and all that. I was referring to the early period of the history of the property.

Q. In what did your interest consist in the Black Rock in 1912?

A. I did not quite understand that.

Q. Judge Dickson asked you when you visited the property in 1912, the Black Rock, whether you were interested in it?

A. Yes.

Q. In what did your interest consist?

A. In 1912?

Q. Three years ago?

A. I don't recall whether that was before the organization of the Black Rock and the issuance of the shares. I sold all of my property, but I don't recall the date, my interest in the Black Rock, and took in pay part shares and part cash. Do you refer to the period before that or after that?

Q. No, after that, in 1912; I wanted to know what your interest consisted of in 1912, whether shares or a direct title?

A. I was interested either as a holder of the title or I was interested as a holder of shares of stock. I do not know which it was at that time.

255 Mr. Kremer: The sale of the property itself was in 1906.

The Witness: I therefore at that time was interested in shares of the stock, which I hold today.

(Witness excused.)

Mr. Folsom: It is stipulated that all of the original locators of the claim, including Mr. Lowe, are all dead; that Michael McNamee and Savage and Burkett, who were the original locators, and one Lowe, who became interested in the early history of the claim, are all dead—simply to explain why we do not call them.

Mr. Dickson: Yes, sir.

The Court: Very well; the record may show that.

Testimony of J. P. Murray for the Plaintiff.

J. P. MURRAY, after being duly sworn as a witness for plaintiff, testified as follows:

Direct examination:

By Mr. Gray:

Q. State your name, residence and occupation?
A. J. P. Murray, Los Angeles, draftsman.
Q. Did you prepare the map, plaintiff's Exhibit 4?
A. Yes, sir.
Q. From what notes did you receive the data that assisted you in making the map?
A. The contours were platted by the surveyor on a 40 foot
256 scale, 40 feet to the inch, and I then enlarged that with a pantograph to 20 feet to the inch.
Q. What surveyor?
A. Robert Lindsey.
Q. And the balance of it?
A. The claim corners were platted from survey notes. Some of the notes were copied and enlarged from maps furnished by the Black Rock Company, and some of the notes were platted on this map directly from survey notes.
Q. Whose survey notes did you use in platting the corners upon the map?
A. Mr. Lindsey's.
Q. And the buildings shown on the map, from what notes did you plat them?
A. I believe that most of the buildings on the Black Rock claim were copied from—I am not positive now that they were copied from a surface map furnished by the Black Rock Company or not, but most of them were tied in to Lindsey's surveys when surveying the corners.
Q. The colors on there was put on how?
A. I simply applied the coloring with a brush.
Q. That was from some of the engineers' instructions?
A. Yes, sir; it was sketched on.

Mr. Gray: I will offer in evidence plaintiff's exhibit No. 4, being a surface map.

Mr. Kremer: At this time don't you desire to embody in
257 the record the understanding of yesterday with reference to qualifying these maps?

Mr. Gray: Yes. It is agreed between us that the maps may be received in evidence without producing the surveyors. If either side shall believe that there is any error in the surveys of the other, it shall be subject to investigation and correction.

Mr. Dickson: Or any errors in platting.

Mr. Gray: Yes.

Mr. Kremer: And that will extend to all the maps produced by either side.

The Court: Very well.

By Mr. Gray:

Q. Exhibit No. 5, did you prepare that?

A. Yes, sir.

Q. Where did you get the information from which you platted the underground workings of these several claims?

A. All of the Elm Orlu workings were platted from actual surveys. The Black Rock workings were platted from survey station notes that we received from the Butte & Superior Company.

Q. And in turn you supplied the survey station notes of the Elm Orlu to the Butte & Superior?

A. Yes, sir. We did not get all the notes from the Butte & Superior, but we got a station for the extreme ends of each level, and platted that, and then oriented the level furnished by them in the shape of a tracing, and transferred it to the map.

258 Q. In other words, you exchanged underground surveys?

—. Yes, sir.

Mr. Gray: We offer the map, Plaintiff's Exhibit No. 5, in evidence.

Plaintiff's Exhibit No. 5 admitted without objection.

Mr. Gray: That is all. We may want to withdraw that and put on some recent piece of work some time during the trial.

Mr. Dickson: Have you a blue print or a white print of that?

Mr. Gray: We have not, but we hope to have one later.

Mr. Dickson: I would like to have one; we might want to check it up.

Mr. Gray: Yes; we will furnish it to you later

By Mr. Gray:

Q. The sections and plans, you prepared the sections and plans that will be introduced, from the underground survey shown by Exhibit No. 5?

A. Yes, sir.

Cross-examination.

By Mr. Dickson:

Q. Calling your attention to Exhibit No. 4, why was not that map extended far enough to the eastward to take in the east end line of the Black Rock claim?

259 A. I don't know.

Q. Did anybody suggest to you that it was not necessary to carry it any further than you did to the east?

A. No, sir, they did not suggest that it was necessary or unnecessary; I got my directions simply where to extend the map to east and west.

Q. How far east?

A. It was shown to me on a sketch just exactly as it is shown there, on a smaller sketch.

Q. Did you expressly or from the understanding that you got from anybody—did you understand that it was not necessary to show on that map any workings easterly of the part displayed there in the Black Rock at present?

A. Why, I certainly supposed it was not necessary.

Q. From whom did you get that understanding that it was not necessary to show the east end line of the Black Rock claim?

A. I believe that Mr. Green showed me the limits.

Q. Who is Mr. Green; what connection has he with the plaintiff company?

A. I believe he is an engineer employed by the company.

Q. And has been for many years?

A. Well, I don't know that.

Q. At all events your recollection is that Mr. Green instructed you or informed you that it was not necessary to show upon this Exhibit 4 anything to the east of what is shown upon Exhibit 4?

260 A. Mr. Green showed me a plat on a small scale of the district, with a line drawn around a certain portion of it, and he stated that they wanted a plan map on a 20 foot to the inch scale of those dimensions.

Q. And did you extend the platting on Exhibit 4 as far east as Mr. Green instructed you to extend it?

A. Yes.

Q. Did you plat upon Exhibit 4 all of the notes of surveys that you had received from the Butte Superior Company or did you omit some of them?

A. On this exhibit?

Q. Yes.

A. I don't know that I ever got any notes from the Butte Superior Company for this surface——

Q. Any of the engineers of the Butte Superior Company?

A. I mean engineers, of course.

Q. Did you plat upon Exhibit 4 all of the workings that were shown upon maps that were furnished you by the engineers of the Butte Superior Company?

A. No, sir, I believe there were maps furnished to us on a forty foot scale, a tracing, extending further east.

Q. Why didn't you plat those on this Exhibit 4?

A. There wasn't room to plat them.

Q. Hadn't paper enough?

A. Well, probably not.

Q. What?

A. The map was made before——

261 Q. Are we to understand, Mr. Murray, that those workings were omitted—the true reason why they were omitted from Exhibit 4 was because you hadn't the paper enough?

A. No, not quite. Wasn't paper enough on this original map that was already made to receive those workings.

Q. Do you mean to say that you wouldn't put those workings on to the east of anything that is shown there if you had had paper enough? Do you wish the court to understand that?

A. Well, this Exhibit 4, the claim lines were already on this map and the limits of the map were already made.

Q. But the claim lines are not on the map to the east, the east line of the Black Rock?

The Court: I think, counsel, if you have any complaint to find with the map as far as it shows, enter into that on cross examination. But anything that is left off is certainly not competent in this cross examination. We don't care to take up the time with that. If you have any other map with workings further east that you want to show, you will have the opportunity to show them later. This draftsman has only made so much of the map. Now, if you find he has made that portion incorrectly you may demonstrate it upon the cross examination; but anything he has left off we don't care for that.

Mr. Dickson: Do I understand that we cannot, by cross
262 examination, show that under the direction of the engineers of the plaintiff company the draftsman who prepared this map was instructed to leave off works that are material, have a material bearing, in our judgment?

The Court: If they come within the lines of that map, as he shows them, yes; but not if they are outside of those lines. You will have the opportunity to show that yourself when you put in your case, but it certainly is not proper cross examination.

Mr. Dickson: We desire an exception.

The Court: Exception.

Mr. Dickon: We offer to show that on the map furnished the witness by the Butte Superior Company there were other workings shown upon the Black Rock claim that are not shown by this map, easterly of anything shown on this map.

The Court: The offer will be refused for the purpose of not unduly taking up the time of the court. Exception may be noted.

Mr. Dickson: I call your attention to the piece of work shown on Exhibit 4 to which I now point, which is not designated in any way. Do you know what that piece of work is, whether it is a trench or what?

A. I judge it is a trench.

Q. Were you instructed by anyone, Mr. Green or anybody connected with the plaintiff company, not to show any—represent any ore in that trench?

A. You mean the red paint, I suppose?

263 Q. What?

A. You mean the red paint, to put in red paint across this trench?

Q. Yes, the red is intended to represent ores, I understand?

A. Yes, I understand.

Q. And that red you put on under the direction of some of the experts?

A. Yes, sir.

Q. On this map Exhibit 4?
A. Yes, sir.
Q. Were you directed to or to not show any red on this trench out towards its further end?
A. I paid no attention to that. The outlines of these geologists were penciled on to the map, and I simply colored it.
Q. Did you put red coloring on this map wherever you were instructed to do so by any of the engineers?
A. I followed the pencil lines as sketched on the map.
Q. Will you not answer that question directly?
A. I beg your pardon?
Q. Did you put upon this map, Exhibit 4, the coloring, red coloring, wherever you were told by the engineers or any of the engineers of the plaintiff company to put the red?
A. Yes, sir, I put the red where I was told to put it.
Q. On the map furnished by the Butte Superior Company
264 and in the notes furnished you by the Butte Superior Company's engineers, was there not a stope represented connecting with this trench to which I have just pointed?
A. I don't remember that there was.
Q. Have you a copy of the maps that were furnished to you?
A. I think so.
Q. Will you be good enough to produce them some time this afternoon, have them here at two o'clock, so that you may look at them?
A. Yes, sir.
Q. I would like to have this trench, inasmuch as it is not designated——
A. That was not surveyed by this company.
Q. What is that?
A. I don't remember whether that particular cut was platted on there from survey notes or from a copy of a map.
Q. Furnished to you by the Butte Superior?
A. Yes, I would have to find out about it.
Q. My question was was there, either in the notes that were furnished you by the Butte Superior Company or on the map furnished you by the Butte Superior Company a stope connecting with the north end of that trench?
A. I understand. You want to know if there was a stope or something else connected with the end of that trench?
Q. A stope, yes?
265 A. That is not platted on this map?
Q. Yes.
A. Of course I can't tell that now, but I can find out.
Q. Will you step here and put your initials over this trench we have been speaking about, write your initials on this map right over the trench which I have pointed out?

(The witness marks the map.)

Q. You have marked it in pencil with your initials.
A. Yes, sir.

Q. What are they?
A. J. B. M.

(Witness excused.)

Testimony of Fred T. Greene for the Plaintiff.

FRED T. GREENE, called as a witness on behalf of the plaintiff, being first duly sworn, testified as follows:

Direct examination.

By Mr. Gray:

Q. Will you state your name and residence?
A. Fred T. Greene, Butte, Montana.
Q. What is your profession?
A. Mining engineer and mining geologist.
Q. Where were you educated?
A. Toronto University and the Michigan College of Mines.
Q. What experience have you had in the practice of your profession and where?

266 A. I came to Butte immediately upon graduation from the Michigan College of Mines in 1897 and entered the employ of the Boston & Montana Company as assistant engineer and was with them for two years, during the time that the litigation which was famous in this camp was initiated, and I frequently went underground with such men as Clarence King, E. E. Chase, Mr. Walter Wiley, and others engaged in the litigation for the Boston & Montana, and the Butte & Boston Companies and had a chance to learn some of the structure of the camp from them. That work continued two years when I went to British Columbia as chief engineer of the War Eagle and Center Star Mining Companies, where, besides the engineering, I conducted a geological examination of the structure of the two mines and those immediately surrounding them. And after a year and about four months I returned to Butte to become Mr. Winchell's chief assistant with the Anaconda Company. Mr. Winchell was then the chief geologist for the Anaconda Copper Mining Company. That engagement continued until about the first of June, 1906, six years. And during that time I was engaged in the study of all the Anaconda Copper Mining Company's, Colorado Mining & Smelting Company's, Boston & Montana, Butte & Boston, and the Washoe Copper Company's properties in Butte besides those of other companies, such as the Stewart Mining Company, the Original Mining Company. My duties during that time were to study the structure of all of those mines and to

267 outline development work and direct the same.

Q. For what purpose?

A. For two purposes. The development of the structure in the preparation of mining lawsuits; but principally in the development of the structures for the economic operation of the mines. That work led me into almost all the mines in the Butte camp, all the

mines in the copper district of Butte. In June, 1906, I left the employ of the Anaconda Mining Company and soon after entered the employ of the Great Northern, again as Mr. Winchell's chief assistant. That employment continued for two years and a half, and I then opened an office of my own and have maintained such an office since that time. While I have been in the independent practice I have studied the structure of the Cœur d'Alene mining district not only for the purpose of developing the structure for litigation, but for economical development also. I have examined mines in Alaska, British Columbia, Washington, Oregon, Washington, Idaho, Wyoming, Colorado, Arizona, New Mexico, California and Dakota.

Q. Are you familiar with the vein known as the Rainbow lode in the Butte district?

A. Yes, sir.

Q. When did you first become familiar with it and under what circumstances?

A. I first became familiar with it when I was doing some surveying for the Boston & Montana Company in 1898. They then
268 owned three claims known as the Moose, the Rarie and the Badger State. I surveyed these claims and surveyed the workings. The only workings underground at depth were from the Moose mine, and I made the survey for the map of the Moose mine. That took me up into that country, and out of curiosity I visited the Moulton, Alice, Valdemere and Magna Charta claims, and saw upon them what was generally known as the Rainbow lode.

Q. When did you first become familiar with the Elm Orlu and Black Rock claims and under what circumstances?

A. Well, I knew of them, and had been on them but without any more than a careless visit during 1897 and 1898; but about 1905, I think it was, I went to examine the Jersey Blue claim.

Q. That is situated just north of the Elm Orlu and west of the Black Rock?

A. Yes, sir.

Q. State what your observations were at that time?

A. At that time the interest in the north end of the camp had been excited by the discovery in the Speculator mine and the possibility——

The Court: Just a minute. Just answer the questions put to you by the counsel and we will get along better.

A. At the time of my visit I came up over the ground from this east end and passed over the Black Rock claim and the Elm Orlu claim and then in to the Jersey Blue. I located myself by
269 various claim corners and was able to identify the Jersey Blue shaft, which was the only working shaft that was visible at that time, although it was not then operating. At the Jersey Blue shaft and west of it I could trace a vein which laid in a northwesterly direction and followed it up to the railroad, the railroad fill and cut and that was northwest of the Jersey Blue shaft possibly 250 or 300 feet. There the vein became obscure and was not traceable and I went back and was able to follow the vein to what I believed then a

crossing of the Rainbow lode. The outcrop was easily distinguishable but not particularly prominent. That is all I can say about the Jersey Blue claim.

Q. Now, with reference to the Elm Orlu and any observation you made concerning it at that time?

A. At that time the Rainbow lode was very plain and distinct, traversing the Black Rock claim from north to south in a southwesterly direction and as nearly as I could judge then it seemed to be displaced considerable by the Jersey Blue vein. There were two very prominent outcroppings, one on the Black Rock and one up on the hill, on the Elm Orlu.

Q. Now, where would that on the Elm Orlu be with reference to the discovery marked on Exhibit 4 of the Elm Orlu?

A. I am not able to identify the discovery because I did not know where it was then; but it would be somewhere east of the discovery.

270 Q. Now, on the Black Rock, where was that cropping?

A. It was along the side hill about where the letter "R" in "Rainbow" is.

Q. Were there any underground workings upon the Elm Orlu that were accessible at that time?

A. I was afraid to go down in them; they didn't look safe.

Q. Were you in any workings upon the Black Rock?

A. Yes. There was a tunnel on the Black Rock which started on the Niagra claim and followed southwesterly along a very large and distinct vein.

Q. What was the name that was applied to that tunnel and by which it was known?

A. I think it was known as the Niagara tunnel.

Q. Can you state how large the vein was that you say you saw on there approximately?

A. I came to the conclusion then that vein was probably one hundred feet wide or more.

Q. Mr. Green, when did you next become acquainted with the Elm Orlu and Black Rock claims and when did you next have occasion to examine them?

A. December, 1913.

Q. From that time to the present time will you state what your acquaintance and familiarity with them has been?

A. At that time I undertook charge of the development work in the Elm Orlu for the Elm Orlu and was constantly engaged

271 for them until now, in directing that development work and in studying in detail the two mines, Black Rock and Elm Orlu.

Q. How much time have you spent during that period and how often have you visited the properties?

A. I visited it sometimes every day for long periods; sometimes two or three times a week. There have been intervals of two weeks when I was out of town and didn't visit them.

Q. During that period state what the fact is as to your having examined all of the accessible underground workings in the mines?

A. I have been in all the accessible underground workings and have made a detailed study of them.

Q. Under your direction there has been prepared a series of plans and maps showing the underground levels, each of them, has there not?

A. There has.

Q. Coming now first to the surface, will you state what your investigation and examination during these last two years or at least two years has shown you concerning the structure and veins and the surface of the Elm Orlu and Black Rock claims and the structure as disclosed upon the surface; just describe the surface?

A. My first visit to the surface was in—that is the first visit studying any details of the surface—was in the spring of 1914, and at that time I found a very large mine dump northeast of the Elm Orlu shaft which entirely covered the surface, but immediately east of the toe of that dump, where the dump meets the original sur-
272 face, three cuts in which there was a very prominent east and west vein. As you go to the northwest you find several other minor cuts but just near to the toe of the dump where you find one large cut which adjoins a very large quartz outcrop running easterly and westerly. At the west end of the claim there are three cuts, one apparently the remains of an old shaft.

Mr. Dickson: Are these designated upon the map in any way?

A. Two of them are.

Mr. Dickson: How?

A. By these circular or irregular circular marks.

Mr. Dickson: Is there any name given them on the map?

A. They have no name on the map.

Mr. Gray:

Q. Where are they situated; on what claims?

A. They are on the Poser and west, immediately west of the west end line of the Elm Orlu. The surface at that time was covered or practically covered with timber belonging to the Black Rock Mining Company. That is not visible. That has been removed and these cuts have been later made. The original surface also has been obscured and covered by various shops and buildings and dumps belonging to the Black Rock, but again east of the dump on the Black Rock we found outeroppings running a little north of east. There were two of these, one shown here and labeled "Rainbow
273 lode," and one colored red immediately above the words "Clark tunnel."

Q. Go through the workings upon the surface which have been made since that time and state what they disclose?

A. Since that time we have dug several trenches, one directly on the west end line of the Elm Orlu claim and marked on this exhibit "A;" one 150 feet east of the Elm Orlu dump, marked "B," was made for the Black Rock Company; C and D and E were then made for the Elm Orlu Company, and these were continued in a series—D-1, G, H, K and L. The trench A shows the point at which the

Rainbow vein departs from the Elm Orlu claim across its west end line. The trench B shows the Rainbow lode again very wide, as does also C. D shows the Rainbow lode at the north end and a fork of it in the southerly end running out along a trench called D-1. This fork has been followed——

Q. That is the southerly fork?

A. Yes, the southerly fork has been followed along the trench F-2, G, H, K and F to the southeast, and from there on has not been developed.

Q. You have not mentioned E?

A. E was dug as near as we could to the north side line of the Elm Orlu and shows very closely the point where the Rainbow lode again departs from the Elm Orlu claim to the northeast, and enters the Back Rock claim.

Q. That is the northern branch or fork?

274 A. The northern fork crosses the line just north of trench E. This trench is about five or six feet from that north side line.

Q. How far does that branch, that northerly branch of the Rainbow, the footwall portion of it, or the eastern wall of it, cross that line, in feet, from the southwest corner of the Black Rock?

A. I have never measured the exact distance from that southwest corner; it crosses about 25 feet from the east end of trench E.

Q. Mr. Green, what is the green line that you have shown upon the map extending clear from the Elm Orlu west end line through the claim and through the Black Rock and out of the north line of the Black Rock claim?

A. That is a strong fault fissure, a plane of movement, and has been designated the Black Rock fault. It is known through the whole length as shown here, and is disclosed in trench A, trench- B, C, D and E, and there is a trench M, which crosses at the point that is shown on this map, but I have not seen it there.

Q. The blue line which is shown crossing northwesterly and southeasterly through the Jersey Blue and the Black Rock, what does that represent?

A. That line represents the approximate outcrop of the Jersey Blue vein.

Q. The other blue lines upon the Elm Orlu to the south of the Rainbow lode indicate what?

A. They represent northwest and southeast fault veins be-

275 longing to the same type as the Jersey Blue.

Q. Mr. Green, with reference now to the surface, have you found the outcrop of the Rainbow vein or lode continuously in either direction in these claims?

A. Yes, sir; I have followed them in both directions on these claims.

Q. How far?

A. To the easterly as far as the gulch that is depicted on the north side of this map, and which runs on to the east, and over near where the lode would cross the gulch, it is quite apparently faulted, and the Rainbow lode continues then north of the gulch to the eastward.

To the west the vein can be followed, the Rainbow lode can be followed about 300 feet west of the west end line of the Elm Orlu and there the wash is very deep, and it is covered, and is not seen until we get west of the Poser shaft, on the Poser claim. From there it can be traced through the Valdamer, the Magna Charta, the Alice, the Fraction, and the Frank Moulton claims.

Plans on wheels marked Plaintiff's Exhibits Nos. 6 to 25, both inclusive.

Q. These several plans which have been marked now Exhibits Nos. 6 to 25 inclusive, are plans of the various levels prepared by Mr. Murray, concerning which he testified?

A. Yes, sir.

Q. And the geology was placed on there by whom?

A. By the Clark engineers.

276 Q. Including yourself?

A. Including myself and the other engineers employed by Mr. Clark.

Mr. Gray: I will offer these plats or plans in evidence at this time, subject to cross-examination.

Plans on wheels numbered from 6 to 25, inclusive, admitted in evidence without objection.

Q. Mr. Green, will you now state to the court what you have observed beneath the surface of these claims; what is disclosed in the underground workings, and the geological structure and the structural relations and ages of the veins that are there disclosed; first starting near the surface and following the veins through the developments down to the lowest level; will you give the number of the exhibit as you refer to it?

A. The first underground working nearest the surface to which we have any access is shown on Plaintiff's Exhibit No. 1, and consists of what we have called the discovery tunnel. This discovery tunnel was started in the spring of 1914, in an effort to locate the vein at or near what the patent notes describe as the discovery shaft, for the reason that that area is and has been for a long time covered by the Elm Orlu dump. The shaft was started on the side hill to the north of the dump, at its immediate edge, and was driven south to a point immediately under the discovery shaft. At that point we found the timbers of a shaft, and concluded that we had found the discovery shaft. We continued our crosscut to the south

277 across the vein, which at that point was something in excess of 40 feet in width—a few feet more than 40 feet in width. It was then determined to follow that vein westerly, and the drift was driven from the southern end of the shaft, and south of the boundary of the vein, in order to obviate going through a very undesirable shaft. At a point shown on the map as Transit Point No. 10, we again encountered the vein in the old stopes, and we turned westerly along those stopes and followed those stopes to within about

45 or 50 feet of the west end line. The drift was then continued on vein to the west end line, and crosscuts north and south were made, which disclosed the vein having a width of something slightly in excess of 40 feet at and crossing the west end line of the claim in a westerly direction.

Q. With reference to Cut A, where was that crosscut?

A. That crosscut is almost immediately under Cut A.

Q. How deep there was the discovery shaft or what you assumed to be the discovery shaft?

A. It would be just about 100 feet deep. It became necessary to connect up along the vein from the discovery shaft west to the point 10, and that was done by crosscutting north to Transit Point 20, and then drifting easterly and westerly along the old stopes to the discovery shaft.

Mr. Dickson: If it will save any time, we will state that we make no dispute about the fact that from the discovery shaft of the
278 Elm Orlu as marked on Exhibit 6, there is a vein continuously from that to and across the westerly end line of the claim.

Mr. Gray: Very well, but there is one question I wanted to ask.

Q. By whom were these two workings northerly and southerly driven, and what did they disclose; I see they are marked in blue?

A. Those were driven—well, I think I had better go back to the beginning, because there is more work along there that was done at the request of the Black Rock Company. The answer to your question is the Black Rock Company.

Q. They make no claim as to the vein going there. I want to know what those workings are and what they disclose and by whom they were driven?

A. From the southerly end of the discovery tunnel we were asked to drive east, and within about four feet of the tunnel we ran into an old north and south crosscut running from the old stopes south to a point which I will mark Z.

Mr. Dickson: I make the suggestion in the interest of saving time that we will make no dispute but what the vein continues from the discovery shaft in a northeasterly direction to and across the common boundary line between the Elm Orlu and Black Rock. There will be a controversy as to the exact point of crossing, however.

Q. Proceed.

279 A. We drove southeasterly along a narrow slip which contained or was accompanied by—— Southeasterly from this drift easterly driven by the Black Rock Company, we followed southeasterly for a distance shown on the map, about 125 or 130 feet, on a small slip, which contained from six inches of quartz in some places down to nothing, and some places up to maybe a foot of quartz, about the same time we were asked to drift northwesterly, and did so, along a similar slip, which also has from no quartz up to eight or ten inches along in it. This work was carried northwesterly to Point

38, and the slip turning almost due west, the work was stopped, and a crosscut was made north from station 38 through some old workings that were encountered in driving this northwest drift.

Q. What did they show?

A. This crosscut showed the old workings and an apparent east and west vein.

Q. The trenches and the red showing in them was the same as you have described on the surface map, was it?

A. Yes, sir.

Q. What is this, marked Wolvin Raise?

A. The Wolvin Raise is a raise from the Wolvin tunnel to the surface, and shows in the next map.

Q. What are the workings shown in the northeast corner?

A. They are surface workings toward the east of the Black
280 Rock claim, about which Mr. Dickson was questioning Mr. Murray just now.

Q. Describe what those workings are and what they disclose?

A. As I understand it, the thing that was asked about was not the workings there.

Q. Well, no; there is no geology there. Is that on the next map?

A. It is on a map below.

Q. Well, disregard this map then, and proceed in your own way.

A. The next map is marked Plaintiff's Exhibit No. 7, and shows three levels, the Elm Orlu 100, the McLeod drift from the Wolvin raise, at the same elevation as the Elm Orlu 100, and also the Wolvin tunnel.

Q. Before you go further, what you have shown in red upon these other exhibits represents what?

A. It represents vein material belonging to the east and west series of veins.

Q. And the blue?

A. The blue represents vein and vein material of the veins of the northwest—southeast series.

Q. And the green?

A. The green is fault material of the northeast, southwest series.

Q. That is carried through all the exhibits?

A. That is carried through all the exhibits.

Q. Now, you may just go on.

A. The 100 foot level of the Elm Orlu was encountered—
281 or the shaft which reaches the 100 foot level of the Elm Orlu was encountered in the workings of the discovery tunnel. The shaft was repaired somewhat and a ladder put in it, and we found a level apparently, yet it in some places was very badly caved, which showed a very strong fault gouge which we identified as the Black Rock fault, a wide east-west vein and two northwest-southeast fault slips.

Mr. Dickson: Where?

A. Through the drift, in the level and at the end of two crosscuts running south and a long north and south crosscut at the east end of this level shows two prominent strands of the east-west lode

at Transit station 38, where the quartz is from four to six feet in width; and at the northerly extremity of the crosscut where the quartz is about seven feet in width.

Mr. Gray:

Q. What is between these strands of the vein?

A. This north-south crosscut, between the two strands just granite, which was at that particular point rather highly altered.

Mr. Dickson: Unaltered?

A. No, it is altered quite considerable.

Mr. Gray:

Q. Come on east. The judge admits that one strand at least crosses the south line of the Black Rock?

A. The Wolvin raise is immediately south of the crossing of the vein over the Black Rock south side line, and from it a drift has been driven westerly along the vein and also along the Black Rock
282 fault, which in all cases or practically all cases terminates in a strike fault. The vein is followed out to a south crosscut from here to the western extremity of that drift. That station number is not given and I do not remember it. From a point about thirty feet from the western extremity of that drift a crosscut has been driven south and for its whole length in a very highly altered granite, in which there are a number of quartz and manganese seams, and at the southern extremity of this crosscut a drift is now being run along a strong east-west quartz strand of the vein. At this point this strand has a strike north 77° east, for a distance of at least forty feet. They are now driving north of the shaft. A crosscut has been put in at this level about twenty-five feet north of the shaft and at its end a drift is now being driven to the westward. About eighteen feet of this crosscut immediately north of the shaft shows quartz vein material and the drift west had encountered at the time of my last visit a northwest-southeast fault which we identified with one immediately below it in the Wolvin tunnel, and we called it the Wolvin fault. The Wolvin tunnel has been driven almost due south from a point on the sidehill on the Black Rock claim and not far from its mouth and northwest from that east—the Wolvin tunnel has been driven almost due south from a point on the sidehill on the Black Rock claim and not far from its mouth a northwest-southeast fault vein has been encountered which
283 is there some seven or eight feet in width.

Q. Do you identify that as any particular vein?

A. Yes, that is the Jersey Blue vein.

Q. Belongs to the northwest fault series?

A. Belongs to the northwest fault series, yes, sir. The tunnel in that is barren—the tunnel is then in barren granite down to and beyond the drift driven westerly from it. Near or practically at station 488 in this tunnel we found a strong clay gouge and from there for about thirty feet we found very highly crushed granite with many seams of quartz and manganese which I believe to be the

vein, the north fork of the Rainbow lode. We cross the southern extremity of the vein and we again find that heavy, tough blue clay gouge known as the Black Rock fault, and at the southern boundary of this forked vein a drift has been driven easterly on a small quartz seam.

Q. That is this one over here (indicating)?

A. Yes, crossing the north side line of the Elm Orlu. From there south the tunnel encounters one or two small seams of no importance until you reach a drift marked on this map as No. 1 drift East, and there is—and there a strong quartz seam is found which has been followed out to the southeast.

Q. In your judgment what is that, a branch of one of the veins you have referred to or a distinct vein?

A. I do not connect it up directly with any of the workings here, but it is immediately under the south fork of the Rainbow
284 lode and is probably the same as that fork shown on the surface. The next map is marked Plaintiff's Exhibit 8 and is entitled "tunnels." This map shows three tunnels known and marked "Dewey tunnel," "Black Rock tunnel," and "Clark's tunnel." A much smalled tunnel is marked here the gulch tunnel. And the continuation of the Black Rock tunnel again to Daylight is marked "Daylight tunnel." At the time of my first examination of these tunnels in January, I think it was, 1914, the Dewey tunnel consisted of a straight crosscut down to a point some forty feet I think south of the southwest corner of the Black Rock. The Black Rock tunnel at that time was also a long crosscut tunnel and it also extended a short distance south of the common line between the Black Rock and the Elm Orlu and had one accessible drift at station 407 and a very short stub of a drift at station 795, a small diagonal crosscut from station 478 to 479 and then east for a few feet. To the west and to the east it was apparent that the drifts continued, but were caved then. The Clark tunnel had not been driven, and later both the Black Rock and the Dewey tunnels developed the veins shown in the blue and known as the Jersey Blue vein. A drift from the Black Rock tunnel followed west on this vein to a point immediately under the Dewey tunnel; a raise was put up and from the Dewey tunnel at about the same time this work was being driven a drift was driven westerly to the point 810. The vein or the quartz that this drift started on pinched down and no
285 continuation of it was visible. A crosscut was driven south and a couple of small beginnings of drifts were made and later a drift was then driven from 813 westerly along a small slip, which was accompanied by quartz in some places as high as sixteen or eighteen inches. This was followed on westerly to the point marked transit point 838. From there a crosscut was driven northerly. This crosscut was north of the particular small vein which they followed in drift 4, and is pointed towards the large tunnel which shows the outcrop of the Jersey Blue vein. The Black Rock people then started east in the easterly drift, cleaned out that drift to its base and then drifted easterly and northeasterly and on what appeared to be the portion anyway of the Jersey Blue vein. On

this drift they followed the quartz to transit points 186. At that point the quartz ended abruptly and a crosscut was driven north and another seam of quartz was found and followed easterly for a few feet, and the drift was then abandoned and later the drift No. 1 evidently was started easterly or northeasterly again to station 800. A crosscut was made there to the north. This drift from the end of the quartz at station 786 to 800 is through granite, encounters one small northwest-southeast seam. The crosscut north from station 800 was also in granite and encountered two northwest-southeast seams of a fault type. Then they drove easterly or almost due east from station 800. There was a little quartz where they started, but from a point about twelve feet east of station 800 to a
286 foot or so west of transit point 808, the drift traversed granite.

Q. How many feet?

A. That is a distance of 105 or 106 feet.

Q. From where they lost the seam near the station there, 786 to station 800, how far is it that they drove through granite?

A. About fifty-five feet.

Q. All right?

A. At station 808 a very clearly defined vein wall was found and from there east to station 811 they crosscut a small quartz vein about thirty feet along the drift and having a width of twenty-four or twenty-five feet. They followed along the south side of this vein and at a point marked "old shaft" they found the remains of a shaft in that vein. They turned from that shaft to the southeast and drove about twenty-five feet southeasterly through the granite to what was marked here the discovery shaft, a red star. Then they crosscut northerly and encountered the Rainbow vein again at a point thirty feet north of station 840 and crosscut it there for a distance of 35 to 40 feet. This was afterwards opened to daylight and this crosscut has been called "Daylight tunnel." The crosscut was continued south and near transit point 9 some old workings were encountered and a drift driven westerly and easterly. The drift westerly crosses a very distinct fault gouge which we identified as the Black Rock fault and then through a very badly crushed fault area adjacent to it, and then the short crosscut No. 21 on this map
287 was driven back to connect with No. 1 drift east. From station 9 easterly the old gob was followed, the miner's term for old filling—was followed easterly to a point where they were coming out to daylight and the face was caving, but apparently on an east-west vein there was more or less vein material left along the old workings and such a vein existed there, east and west vein.

Mr. Dickson: How far was that from this point?

A. About a hundred feet.

Whereupon an adjournment was taken until 1:30 P. M. of this day, Tuesday, October 19th, 1915.

1:30 p. m., Tuesday, October 19, 1915.

Court met pursuant to adjournment.

FRED T. GREEN resumed the stand.

Direct examination.

By Mr. Gray:

Q. Mr. Green, at the time of adjournment you had just described some workings that followed some seams in the Jersey Blue, and you attempted to follow those seams to the eastward, and you spoke of a large portion of this working as being in granite. What kind of granite was that; was it vein granite or country rock?

A. It is country granite, country rock.

Q. You may proceed from there with the work that was done in carrying this Jersey Blue vein or this other vein to the eastward or southeastward, rather?

288 A. In our opinion the Jersey Blue vein had not been carried to the eastward.

Mr. Dickson: In our opinion?

The Witness: Well, I am not entirely responsible for this.

Mr. Dickson: We are interested in your own opinion.

The Court: There will be an opportunity for cross examination. Let the witness proceed without interruption.

The Witness (continuing): The Jersey Blue vein has not been followed to the east, and we requested the Butte & Superior Company to drive on the vein, along on what we considered the Jersey Blue vein proper, and then a drift was started from station 831, and the vein was followed to the southeast. We expected to prove that the vein would be continuous to the Black Rock fault, where it would be cut off. The drift was driven to the Black Rock fault, and we found the Jersey Blue vein cut off at that point, and immediately beyond the Black Rock fault we found the Rainbow lode. A crosscut was then driven south with the expectation of picking up a portion of the Jersey Blue vein beyond the Black Rock fault. This crosscut encountered a vein of the same type as the Jersey Blue vein at a point shown as station 1033. There a drift was made to the southeast along this fault vein, and also to the northwest, where this fault vein was again cut off by a seam of the Black Rock fault.

289 Q. In your opinion, Mr. Green, is that the same Jersey Blue northwest-southeast fault fissure that had been followed on the north side of the Black Rock fault?

A. It is. Later, from two crosscuts in this Black Rock tunnel known as 22 and 8, drifts were started on some seams of quartz and clay, and the drift from crosscut No. 22 followed along such a seam of quartz and clay to drift No. 4, where it was cut off by the Jersey Blue vein. A drift easterly from crosscut 22 was driven through country granite; it crossed a small northwest-southeast fault slip, and

this drift they followed the quartz to transit points 186. At that point the quartz ended abruptly and a crosscut was driven north and another seam of quartz was found and followed easterly for a few feet, and the drift was then abandoned and later the drift No. 1 evidently was started easterly or northeasterly again to station 800. A crosscut was made there to the north. This drift from the end of the quartz at station 786 to 800 is through granite, encounters one small northwest-southeast seam. The crosscut north from station 800 was also in granite and encountered two northwest-southeast seams of a fault type. Then they drove easterly or almost due east from station 800. There was a little quartz where they started,
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A. At station 808 a very clearly defined vein wall was found and from there east to station 811 they crosscut a small quartz vein about thirty feet along the drift and having a width of twenty-four or twenty-five feet. They followed along the south side of this vein and at a point marked "old shaft" they found the remains of a shaft in that vein. They turned from that shaft to the southeast and drove about twenty-five feet southeasterly through the granite to what was marked here the discovery shaft, a red star. Then they crosscut northerly and encountered the Rainbow vein again at a point thirty feet north of station 840 and crosscut it there for a distance of 35 to 40 feet. This was afterwards opened to daylight and this crosscut has been called "Daylight tunnel." The crosscut was continued south and near transit point 9 some old workings were encountered and a drift driven westerly and easterly. The drift westerly crosses a very distinct fault gouge which we identified as the Black Rock fault and then through a very badly crushed fault area
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the drift westerly from No. 8 crosscut was driven on another small northwest-southeast fault, which has cut the Rainbow vein and displaced it to the southeast of crosscut No. 8. The drift from crosscut 22 and the drift from crosscut 8 holed into one another and are as shown on the map now, but there is no vein following along that drift between stations 1114 and 1120.

Q. A distance of what?

A. A distance of about 80 feet. The old Black Rock tunnel crosscut had cut the Black Rock fault, and a portion, a strand of the Rainbow, near station 410, but between the Jersey Blue vein and that station 410 the crosscut is entirely in country rock. From the Rainbow vein south in this same tunnel the crosscut shows nothing but granite until we get to a point about 45 feet south of station No. 24, where a small vein was found and was drifted on to the southeast for a distance of about 170 feet. The Dewey tunnel, at the request of
290 the Elm Orlu Company, was continued south and at a point about 130 feet south of station 575 we found a strand of the Rainbow lode and crosscut it for approximately forty-five feet. This forty-five feet was almost solid quartz except at one point at station 1081 there was a very strong fault gouge which we identified as the Black Rock fault. The crosscut was continued for about ninety-five feet south of station 1081 and from that station to a point about 10 feet from the face it exposes vein material, thirty feet of which was almost solid quartz and at about 42 or 43 feet in the vein highly altered granite, with many seams of manganese and quartz was found. At the south boundary of this lode there was another solid quartz seam five or six feet in width running a little north of east.

Q. Come on over to your easterly workings.

A. In order to develop the Jersey Blue vein east and south of the Black Rock fault and beyond the Rainbow lode, a tunnel was driven by the Black Rock people at our request known as the Clark tunnel. This tunnel is some twenty-four or twenty-five feet higher than the Black Rock tunnel and runs in a direction about south thirty degrees west from transit point No. 754, about sixty-five feet from the mouth of that tunnel we encountered a northwest-southeast fault vein, but as we were quite sure that this was not the Jersey Blue the tunnel was continued to the southwest and at transit point 1058 a northwest-southeast fault vein with from twelve to eighteen inches of
291 quartz was found and was driven upon. Unfortunately we could not follow it to the northwest for the reason that it was very close to the surface and endangered some of the foundations and machinery belonging to the Black Rock people. It was followed to the southeast far enough to show its direction.

Q. That is the vein shown at station 1058?

A. Yes, sir.

Q. Now, what is your judgment, Mr. Green, whether that is the same vein which you have referred to as the Jersey Blue from station 1072 to 1073?

A. Yes, sir.

Q. Now, then, as to the workings up here—I think you went into the Daylight?

A. I went into the Daylight tunnel and east along a vein south of the Black Rock fault.

Q. You may take the next map?

A. The next map, Plaintiff's Exhibit No. 9 designated "Upper Levels," which shows the Niagra tunnel and some workings which are now inaccessible, such as a shaft immediately above the letter "B" in Black Rock, Northy shaft, Raymond shaft. The Niagra tunnel is a very old working and I have referred to it before as the level or working in which I went along about 1905. The first part of this tunnel is in the nature of a crosscut through country rock to a point No. 388, where the Rainbow lode is encountered and crosscut from there for a distance of forty-five feet to a winze near transit point No. 391. Beyond that winze at the present time and
292 for the last year and a half or more the crosscut is caved in and inaccessible. A diagonal drift followed across the Rainbow lode through transit point 390 and from there south for about fifteen feet where the vein is solid in place. From that place on the crosscut continues for about ten or fifteen feet to a point where it has now caved and beyond there it is inaccessible. The main portion of the Niagara tunnel follows through the Rainbow lode diagonally and to a point near station 394. From there it follows the foot wall or solid quartz to the southwest to a point where there is an old drift to the west about twelve feet southwest of station 400. There the tunnel left the vein and followed from there southwest to the Black Rock shaft through very badly broken, shattered granite. At station 943 a drift was run to the east and at a point thirty feet from station 943 they encountered a very strong clay fault which we believe to be the Black Rock fault, and from there east followed some old workings.

The Witness: A crosscut was then driven south from station 969, and this also encounters other old workings in which there is an east and west vein. Drifts were run in both directions from the southern extremity or the southern wall of this east-west vein from station 1007. The old workings were followed to the west back to the main portion of the Niagara tunnel, where the Black Rock fault crosses it. To the east the vein was followed through this southern drift from the Black Rock tunnel to a point near station 1007,
293 where it is faulted to the north. There a crosscut was driven, and the vein was again found and followed for a short distance. This drift was abandoned, and a new diagonal crosscut was made from station 1147, where the vein was again found, and followed to the eastward along the drift which follows closely along the located south side line of the Niagara claim. At a point 100 feet east of station 1107 the vein was left, for some reason, and the drift driven in the country rock along the southern boundary to a point—well, that is not quite the history of it; I will have to go back to the Mill tunnel. The connection was made somewhere between station 1147 and station 1118. The Mill tunnel was driven in a southeasterly direction, and at a point about 110 feet from the mouth, at station 982, a crosscut was made from the tunnel. In this crosscut there were four seams of varying thickness, two of which were a

foot or more in width, one 30 feet and one 44 feet southeast of transit point 983, and each containing about a foot or more of quartz with a very distinct clay gouge on the wall. A drift was driven from this crosscut, starting at transit point 983, in a westerly direction. This crosscuts the country rock, and at a point 100 feet west of station 983 one of the northwest-southeast faults is again encountered and followed for a short distance, probably 12 or 15 feet. The drift left this one and crosscut the country rock again for a distance of 60 feet, where a second northwest-southeast fault was found and followed, first to the northwest, where it encountered old workings
294 which stopped very abruptly within the limit of this drift. This northwest-southeast fault terminates, or rather intersects this east-west vein at this point near station 1118, and at the present time the crosscut is being extended to the north with the expectation of finding this vein to the north faulted in the same manner as it was near station 1107, and crossing the north side line of the Black Rock claim.

Q. Mr. Green, you have spoken of this working from 983 to 1118 as a drift; do you mean that?

A. Well, in direction it resembles our drifts, but practically it is a crosscut.

Q. Except where you pointed out, it follows those slips for a short distance?

A. Yes.

Q. You may proceed?

A. The next map is marked Plaintiff's Exhibit No. 10, and shows the 300 foot level of the Black Rock and the 500 foot level of the Elm Orlu, these being the next levels accessible immediately below the tunnels described in the last map.

Q. By the way, is the 300 level or anything below the 100 accessible?

A. No, not at this time.

Q. Has it been at any time since you have been examining this ground?

A. No, sir.

Q. Are the 300 level of the Black Rock and the 500 of the Elm Orlu on the same level?

295 A. Not exactly, no; the 300 Niagara is about 100 feet higher than the 500 Elm Orlu, but the two are put on as a matter of convenience.

Q. It has been suggested that the 300 Black Rock is accessible?

A. Yes, for a certain portion of it.

Q. I was referring to the Elm Orlu workings?

A. On the 500 Elm Orlu from the shaft a crosscut was driven in the ordinary course of mining operations, and about 45 feet from the shaft station the Rainbow vein was encountered and was crosscut for a total width of about 45 feet. This was followed to the west and to the east, and mining was conducted through the ordinary stoping methods upon the Rainbow vein. Along the north wall of the Rainbow there is a very distinct, very wide clay gouge, which can be followed from the western limit of this map clear east to

transit point 60. It is on the north wall of the vein as far as transit point 48, where it makes a turn to the northeast and departs from the 500 level in the direction of about north 65 east. The Rainbow lode shows various widths throughout this portion of the 500, and at transit point 51 long crosscuts run north and south, and in the north crosscut the Rainbow lode has been shown to have a width of about 30 feet north of the Black Rock fault, and in the south crosscut a width of about 8 feet south of the Black Rock fault. In the southern crosscut, about forty feet from the main drift an east-west strand is found where the quartz is about four feet wide.
296 The rest of the crosscut is in country granite.

Q. How about the 511 crosscut; that one on the south; what is that?

A. The 511 crosscut shows the Rainbow lode having a width of about fifteen feet. At the southern boundary there is a very strong fault gouge. The crosscut from there on for about fifty feet is in the granite and is crossed by a fault which there runs almost north and south but turns as you go south to a northwest-southeasterly direction and in the limits of the crosscut cuts off, terminates a large quartz vein.

Q. Is there any connection downward upon the Rainbow lode from that level?

A. Yes. At a point about eighty feet easterly from the shaft crosscut there is a raise which extends downward to the 700 level of the Elm Orlu. This raise was drifted from the 700 foot level up north to the 500 and stopes were made from that raise. The 300 foot level of the Black Rock as far as I know is accessible only through the old Niagra shaft. At the bottom of this shaft is a level shown on this map and marked 300 foot level Black Rock. Near the shaft there is an east-west vein which has been stoped and from which ores have been mined, which has a width of about twelve feet. A crosscut was driven to the southeast and as there are no transit points on this map, no marks to identify it, this crosscut goes to the southeast from the east-west vein spoken of before about fifty-five feet where another vein is found and about 62 or 63 feet from that
297 northerly vein a very strong gouge is encountered. The vein material and the gouge run closely east and west and the crosscut continues southeast and discloses a vein seventy feet thick which has been drifted upon and stopes made along this drift. The drift is accessible back to the point—to a point 290 feet westerly from the Niagra shaft crosscut. There a northwest-southeast fault vein is found which has been followed for about sixty feet to the southeast, where it leaves the crosscut and the crosscut turns to due south and at a point about twenty-five feet from this turn a northeast-southwest fault is found. At point 120 feet west of the Niagra shaft crosscut another crosscut has been drifted south which shows the one wall of the Rainbow lode about five or six feet south of the drift and from there goes through granite to a strong fault gouge running northeast and southwest, which apparently is the same as that disclosed in the crosscut to the west. South of this gouge there is a strong east-west vein about twenty-five feet in width upon which

there has been some small stopes made along its south wall and a drift is run to the southwest along it.

Q. I note you have marked on here or indicated in green the Black Rock fault; do you identify it as that?

A. I believe that it the Black Rock fault.

Q. And the red indicates what?

A. The Rainbow lode.

Q. Or one of the strands of that vein?

A. Yes.

298 Q. Mr. Green, is there a raise that breaks into the 500 near the east end of that level?

A. A raise was driven from the 450 foot level of the Black Rock shaft up through and above our 500 foot level.

Q. What was it following?

A. They started on the Pyle strand of the Rainbow lode.

Q. That will be shown below, will it?

A. Yes, sir.

Q. Was that carried up to the 500 foot level and if not, why?

A. It was carried up to within about two floors, where it was very distinct, but became very badly broken and crushed and other things coming in to the raise made the Pyle strand very indistinct, not easily followed.

Q. You may proceed with the next level?

A. The next map is marked Plaintiff's Exhibit 11 and shows the 400 foot level of the Black Rock. This is a short distance below our 500 foot, the Elm Orlu 500. From the Black Rock shaft the old crosscut north reaches the Rainbow lode and drifts to the east and southwest were made from that.

Q. Doesn't it also show another level?

A. Yes, it shows the 450 foot level to the south, which is a little more than a crosscut, with two small drifts from that. The workings east of the shaft crosscut are not accessible, but to the west

299 the Rainbow vein was followed in a southwesterly direction to station 281. From there a diagonal crosscut through the vein across the Rainbow lode to station 282 where a very strong wall is found and what is probably a seam of the Black Rock fault. There the gouge is not very thick, possibly half an inch, but the wall is extremely remarkable for its smoothness and constant straightness. This ore drift followed the Rainbow lode out to a crosscut which was accessible at the time of my examination about 115 feet west of station 284. That crosscut showed the Rainbow lode some twenty feet in width with a distinct and marked gouge along its north wall. At a point thirty-five feet west of station 284 a crosscut was found which in turn shows the Rainbow lode to be about 22 or 23 feet in width. I will state that this is a copy of the Black Rock map and does not show the full length of this crosscut. The crosscut actually reaches the south wall of the vein at that point. From station 284 a diagonal crosscut has been run out to the northwest, which crossed a very strong northeast-southwest fault which is the Black Rock fault, and from there west practically nothing is disclosed except unaltered country granite, to a point 160 feet northwest of station 2, where the

drift was caved and beyond which the workings were not accessible. Two crosscuts existed at the time of my first examination, one No. 406 and one No. 412. These crosscuts go through granite, country rock in a northerly direction to near their ends. They disclose the Jersey Blue vein. In the 412 the vein is strong and six or
300 seven feet of very good quartz with a very marked clay gouge on the north wall. In crosscut 406 the vein was again found near the north end, but it is little more than a gouge with three or four feet of crushed granite and some quartz. This has been followed to the east and I think the drift is continuing to the east. Crosscut 414 was drifted later and it crossed a small northwest-southeast vein of quartz about twelve or fifteen feet north of station 748. It is not shown on here but it is a small northwest-southeast vein of quartz.

Mr. Gray: That would be about here (indicating)?

A. Yes. In an area that is very badly crushed and broken. At a point about twelve feet north of station 749 the Black Rock fault was encountered and the crosscut was driven on north from that point for a distance of about seventy feet without disclosing anything further except immediately north of the Black Rock fault and on the west side it looks as though a vein might come in at that point. I would be inclined to believe that the Jersey Blue vein will be found to be cut off by the Black Rock fault near that point.

Q. By "cut off" you mean what; cut off from what course?

A. Cut off on all of its courses, both its strike and its dip; cut off and displaced.

Q. Do you find it indicated any place else?

A. Not on this level, no. About fifty feet lower than the 400 foot level there is a crosscut driven for the Elm Orlu Company to
301 the south. This crosscut was driven clear across the Elm Orlu claim believing that the Jersey Blue vein would be found on that crosscut at a point about sixty-five feet south of the shaft, and a drift was run at our request to the northwest along a northwest-southeast fault vein, which in my opinion is the portion of the Jersey Blue vein which exists to the east and south of the Black Rock fault. This drift, No. 456, followed the Jersey Blue vein for a distance of about 75 feet. At a point about 66 feet from No. 451 crosscut on the south side of the Jersey Blue vein we found a quartz manganese vein running northeasterly and southwesterly, which abruptly terminates against the Jersey Blue vein. This is a part of the Rainbow lode. In the face of this drift we encountered the southern strand of the Black Rock fault which I have mentioned as being in No. 402 drift on the 400 foot level. This strand of the Black Rock fault in turn terminates the Jersey Blue vein. So that we have a direct relation of the three at that point; the Rainbow terminated by the Jersey Blue——

Q. By terminated you mean offset or faulted?

A. As far as this particular area is concerned it terminates it at that point; it will be found beyond, but it intersects it at that point and dislocates it.

Q. Faults it in other words?

A. Yes, faults it. And then the Jersey Blue vein also is faulted by the Black Rock fault. To the south near the station 548
302 we identify a strand of the Rainbow lode running a little south of east, and being the Pyle strand, and from that point a raise was driven at our request up to our 500 foot level. A drift was made for us from here 455 feet to the east on this same strand, to where a raise came up from the 700 foot level of the Black Rock. The drift was run before the raise got up that far.

Q. Was that connection made on this Pyle strand?

A. That connection was made on this Pyle strand.

Q. That is the same one that you mentioned as being within a couple of floors of the 500?

A. Yes, sir.

The next map is marked Plaintiff's Exhibit No. 12. This map shows the 700 level of the Elm Orlu and the 500 foot level of the Black Rock. The 700 foot level of the Elm Orlu consists of a shaft crosscut to the vein and a drift easterly on the vein from which stopes were made. The Black Rock fault shows on the north wall of the Rainbow lode in this drift. Only a very small portion of it was accessible to me since I have been with Mr. Clark on this case, but the shaft crosscut shows a vein about 30 feet wide, and a crosscut east of the shaft, No. 703, shows the vein at least 40 feet wide.

Q. The geology of the eastern portion of those workings you have been on as the result of what?

A. Mr. Pyle's and Mr. Weed's observations.

Q. Mr. Green, one other question: The last level of the Elm Orlu was the 500; was there a 600 foot level?

303 A. There is no 600 foot level.

Q. Then this is the next level?

A. Yes. At the same elevation as our 700 a crosscut from a raise which followed the Jersey Blue vein from our 800 up to our 500 was driven, and numbered on this map 719. This crosscut was driven at the request of the Black Rock Company, and in it was found—in the raise first—the Jersey Blue vein, and at a point south of the Jersey Blue vein 125 to about 180 feet there was the main strand of the Rainbow disclosed. At a point about 165 to 170 feet immediately under the bottom of the U the Black Rock fault was found, and in the face of the crosscut from 245 to 255 feet an east-west strand of the Rainbow was found, which is apparently the Pyle strand. The map also shows the 500 foot level of the Black Rock, and in this level the shaft station shows the Black Rock fault at its north end, and the drift was driven to the east, No. 503, along the south wall of the Rainbow lode. At transit points No. 636 two crosscuts were driven, Nos. 513 and 515. 515 shows the Black Rock fault and a small seam of the Rainbow lode. Near the face of this crosscut at a distance of about 100 feet from the station No. 636 another vein is found which appears to belong to the northwest-southeast series. East of crosscut 513, crosscut 515 is apparently in the country rock and discloses nothing of any structural importance. East of these crosscuts about

30 feet a small northwest-southeast fault is found, which cuts
304 off a large block of the Rainbow lode. This has been followed through 503 drift to a point about six feet east of transit point 1046, where the workings are caved. A crosscut through the vein has been driven to the southeast and a drift easterly through the vein to crosscuts Nos. 519 and 521. This follows the Rainbow vein, and at crosscut 521 another northwest-southeast fault displaces the Rainbow vein, and the Rainbow vein is again found in crosscut 521 from near the drift to within about five feet of the northern face, at which point the Black Rock fault again is encountered. Crosscut 519 to the south crosses a block of the Rainbow vein to near its end, where the northwest-southeast fault which was encountered in drift 502 about 30 feet easterly of crosscut 513—there the faulting of the vein is shown at this point.

The next map is Plaintiff's Exhibit No. 13, which shows the 800 foot level of the Elm Orlu. This level developed the Rainbow lode, and in the Rainbow lode large stopes have been made from this level up to the 700 foot level. Immediately northeast of the shaft a lateral has been driven to the southeast, No. 804. In that lateral, about 40 feet from the shaft station the Black Rock is found, together with a vein which we have been in the habit of calling the copper vein, and which, as it is followed eastward, is shown to be a northwest-southeast fault, or part of the northwest-southeast fault series. This northwest-southeast faults the Rainbow lode, and the portion beyond this fault is found to the north. The copper vein is
305 followed to the southeast through drift No. 804. At or near the point where the Rainbow lode is faulted by this fault, a crosscut was run to the north to pick up the Rainbow lode again, and it was found at a point about 75 feet north of the northwest-southeast fault. This crosscut shows the Rainbow lode to have a width of over 55 feet in this crosscut. At a point No. 89 a drift was run east on the Rainbow lode, and a little north of transit point 89 the Black Rock fault was encountered there, with a big tough clay gouge. The crosscut was continued to the north, and at transit point 83 a drift was driven to the eastward, and later the crosscut was continued to the northeast. In that crosscut, about 18 to 20 feet north of station 83, the Jersey Blue vein was encountered.

Q. How far along that crosscut was it from the northerly strand of the Rainbow to the Jersey Blue?

A. A little over 250 feet.

Q. All right; go ahead?

A. The drift easterly from transit point 83 for a distance of about 180 feet follows a very small insignificant slip, upon which there is a little quartz and pyrite. At station 88 the south wall of the Jersey Blue vein was encountered, and easterly from station 88 the Jersey Blue vein was followed at the request of and for the Black Rock Company to a point about five feet east of transit point 97. There the drift was stopped, and a crosscut was driven to the south, numbered on here 817. This crosscut shows the Rainbow lode
306 within about three or four feet of drift No. 808, and crossed the Rainbow lode a distance of 55 feet, which is the width of

the Rainbow lode at that point. About seven feet south of transit point 98 one seam of the Black Rock fault was encountered, and at or very close to the face of crosscut 817 another seam of this same fault was found. Later the Elm Orlu Company continued drift No. 808 in order to develop the point at which the Jersey Blue vein was faulted by the Black Rock fault to transit point 104, where the Jersey Blue vein was faulted by the Black Rock fault, and the drift was continued on to another strand of the Black Rock fault and left there. Later through a drift on the Jersey Blue from the Black Rock 700 a raise was put up which comes in to the 800 Elm Orlu at a point about 28 to 38 feet east of transit point 108. This raise was made by the Black Rock Company for our benefit and a drift from its top and at practically the same elevation as the 800 foot level in the Elm Orlu, was made to the west along the Jersey Blue.

Q. That is drift 810?

A. That is drift 810. This drift followed the Jersey Blue which was somewhat bent to the north and at a point twelve or fourteen feet west of the raise the south wall of the Rainbow vein was found to end against the Jersey Blue vein and faulted from that point to a point about nine feet to the northwest along the Jersey Blue where the south wall of the Rainbow vein again was found. Later a stope was made by the Black Rock Company along the south wall of the
307 Rainbow lode at this point. The drift 810 was continued along the Jersey Blue to a point about ten feet north of station 108, where a strand of the Black Rock fault was found cutting it off, faulting the Jersey Blue at that point. Beyond there we could not recognize any Jersey Blue. It must have been very badly broken because there are strands of the Black Rock fault and are probably east of the crosscut.

Q. Mr. Green, you spoke of this Jersey Blue in 810 being bent northerly. That is as you proceed west it is bent north, as you approach the Black Rock fault?

A. Yes, very perceptibly.

Q. In other words, at that place you found the old Rainbow lode faulted by the Jersey Blue and the Jersey Blue in turn faulted by the Black Rock fault?

A. Yes, sir. Recently we have driven along the south wall of the Rainbow lode to the southwest and followed it in the west drift for a distance now of 155 feet. The drift east on the Rainbow vein No. 806 was driven before I saw the mine, and at station 94 there exist crosscuts north and south which showed the vein to have a width of a little over forty-five feet. Near the north end of this crosscut 811 the Black Rock fault was again encountered having a strike about north seventy east and standing almost vertically with one wall dipping rather sharply to the south. The Rainbow lode was followed on easterly from station 94 and two small faults were found which dislocated it two or three feet, through it two or three feet to the north and at transit point 106 a drift was made
308 to the northeast on the Rainbow lode to a point about sixty feet northeast of station 106, where it was faulted by a strong northeast-southwest fault. The drift was continued——

Q. Northwest-southeast, you say?

A. Northwest-southeast fault. The drift was continued to station 180 and a crosscut made to the north to strike upon the faulted portion of the Rainbow and at a point 25 feet from station 180 a drift was driven easterly on the Rainbow lode and a connection was made last night so that the drift easterly on the Rainbow and the drift westerly from crosscut 817 have now met and show the Rainbow lode the whole length.

Q. What connection is there upon the Rainbow vein from the 800 Elm Orlu to the 700 Elm Orlu?

A. Well, there is a raise right up on here from the 800 to the 700.

Q. Is it stoped up from the 700 to the 800?

A. Apparently. I have not been in the stope. The records show it entirely stoped up. The next map is Plaintiff's exhibit 14 and is a plan of the 700 foot level of the Black Rock. There a crosscut was driven at the request of the Elm Orlu Company from the shaft station which was north I believe of the shaft at that time, and takes a "U" shape to transit post 568, from where it is drifted south and a little west across the greater part of the Elm Orlu claim. This crosscut shows the Rainbow lode from their number 709 drift south for a distance of 67 or 68 feet. On the northern boundary of the vein we again could see the Black Rock fault running northeasterly
309 and southwesterly, and the vein had been stoped on their drift No. 709. At a point about thirty feet south of drift 709 another drift has been run No. 703, which follows the Rainbow backward about forty feet where it is faulted by another or northwest-southeast fault. At a point eighty-five feet south of this No. 703 we found the Jersey Blue vein and at our request a drift was driven to the west along that vein. At a point 130 feet west from transit point 713 we found the south boundary of the Rainbow lode faulted by the Jersey Blue vein. This 702 drift turned considerably to the north along the Jersey Blue vein and at a point ten feet north of transit point 779 the Jersey Blue was cut off and faulted by a strand of the Black Rock fault. The crosscut continued for another twenty feet to the north strand of the Black Rock fault, which coincided with the north wall of the Rainbow lode.

Q. At that point?

A. At that point. The rich, stopable ore was taken out in a stope from their 700 feet up to our 800 foot, westerly from the Jersey Blue for a short distance, about forty-five or fifty feet and easterly for a distance of close to eighty feet. The displacement of the Rainbow by the Jersey Blue is shown clearly by the stoping. North of the Jersey Blue the stoping continues along what was apparently numbered 703 drift and south of the Jersey Blue the Rainbow is stoped along 709 drift and the displacement is in the neighborhood of ten or twelve feet along the Jersey Blue vein.

310 Q. It is just from the point just above this level that the connection has been made that you showed on Exhibit 13 just before?

A. Yes, sir.

Q. With the stopes in the Elm Orlu.

A. Yes, sir.

Q. Was there anything else?

A. Yes. The crosscut 701 was driven prior to December, 1913, for the purpose of locating the Pyle strand of the Rainbow lode. This strand was found at the point where 713 drift had since been driven and a drift was run to this southeast along a branch of that Pyle strand. Later a raise was brought up on the main Pyle strand from 800 of the Black Rock and on the top of that raise drift No. 715 was run. On the west end of the raise the vein quartz was about six to eight feet wide but as you got west it narrowed down to a small fault fissure. At the west side of crosscut 701 the two branches of the Pyle are together and depart to the west but have not been followed.

Q. Upon this level?

A. Upon this level. The next map is Plaintiff's Exhibit 15 and shows in plan the 900 foot level of the Elm Orlu and the 800 foot level of the Black Rock.

Q. Just a moment. Are they on the same elevation, or is there some difference?

A. All our levels are, roughly, from 35 to 40 feet above the corresponding levels on these maps. The 900 foot level of the Elm Orlu shows the big east-west Rainbow lode which has been
311 stoped from this level clear to the 800. Along the south boundary of the Rainbow we first find the Black Rock fault in our drift 904 from fifty to sixty-five feet southeast of station 64. From there on this drift follows one of the northwest-southeast veins to a point near station 70. From there is a lateral and runs northeasterly, and is numbered 903. At transit point 74 we again find the Rainbow lode and from there north to a raise which we have been in the habit of calling the hog raise, the crosscut shows the Rainbow lode. At the north end of the crosscut and in the raise itself at that point we again find the Black Rock fault. The Rainbow has been stoped above drifts 908 and 910 on the Black Rock and drift 908 runs out to the southeast on the Pyle strand of the Rainbow lode. The 800 foot level of the Black Rock also shows the large east-west, northeast-southwest at this point, Rainbow vein, and it also is stoped from the 800 foot up to the 700 foot. When I first saw this level, crosscut 801 extended up about sixty feet south to drift No. 803. From there at the request of the Elm Orlu the crosscut was extended on the south *end* at a point forty-five feet south of the Black Rock south side line we again found the Pyle strand in the Rainbow vein. This strand was drifted upon to the east and west, drift- No. 821 and 804. The drift east was started on the footwall of the Pyle strand and followed to the southeast. About sixty feet from the beginning of this drift a northeast-southwest fault was encountered which displaces this south branch of the Pyle strand only a very little
312 and the strand was carried then to a point close to the east end line. It would have been carried over to the east end line if the surveys had not been incorrect, but when we got to this point we supposed we were over to the east end line, but later surveying showed

that the drift had run more to the southeast than the original maps provided for.

Q. How many feet is the face of it from the line?

A. About three or four feet.

Q. The Pyle strand is still in place?

A. Yes, sir, that branch of the Pyle strand. From 801 crosscut, at our request, this No. 804 drift has been driven on the Pyle strand for a distance of 165 feet. This drift shows a strong vein running easterly and westerly and dipping there also to the north. While—where these drifts leave the 801 crosscut the raise on the Pyle from the 900 comes into this drift and a raise spoken of before as following the Pyle strand upward from the 800 to the 700 were driven. I do not know the numbers of these raises but they are shown in black square spots on the map at the beginning of drifts 821 and 804.

Q. Mr. Green, has there been any effort made to connect up on the Pyle strand from the west end of 804 to the east end of 809 on the Elm Orlu?

A. Well, we have been driving as best we could along that.

313 Q. Along what?

A. Along the Pyle strand of the Rainbow to the southeast.

Q. That is in what working?

A. That is in drift 908. And they have been driving on 804 to connect but the work has been carried on extremely slowly owing to various things and the connection that we had planned has failed for the reason that the work was done too slowly.

Q. The Pyle strand is still shown in the westerly face of 804 or the face of 804?

A. Yes, sir.

Q. And in the face of 908?

A. Yes, sir.

Q. Something interfere with a raise there; was there anything that interfered with the work?

A. It was very hard to dispose of the material which came out of that drift. That was the reason that they gave and I don't doubt that that was the reason.

Q. That is out of drift 804?

A. Out of drift 804.

Q. All right, you may proceed. Was there anything with reference to the condition here which you desire to mention?

A. Just a repetition. Drift 803 follows along the south boundary of the Rainbow and is cut on the east by a northeast-southwest fault, and again on the 700 and it is again cut off by a fault east on the northeast-southwest fault.

314 Q. And the red here to the east shows the stopes and the drifts and stopes above them?

A. Yes, sir. The next map is Plaintiff's No. 16 which is a plan of the 1,000 Elm Orlu level and the 900 Black Rock. This map again shows the large east-west Rainbow lode which has been stoped in three strands north of the lateral numbered here 1,006. This 1,006 lateral followed the Black Rock fault to about transit point 66 where it goes through—rather enters the Rainbow lode and crosses

it from the south wall to the north wall and in going east departs from the Rainbow lode leaving it somewhere to the south and can be followed on out through various workings to crosscut 1017. There the lode has been followed and stoped entirely in 1002 drift and just east, about twenty feet east of crosscut 1013 it is again slightly faulted by a northwest-southeast fault, and at crosscut 1015 another small northeast-northwest fault is found and beyond that again we find a portion of the Rainbow lode.

Q. On that level how far is the Rainbow lode developed?

A. It is developed only a short distance beyond the end of this map.

Q. But across the west end line of the Elm Orlu claim?

A. Across the west end line, yes, sir.

Mr. Dickson: We admit it crosses the west end line at the apex.

315 Mr. Gray: I understand, but I wanted that in the record.

The Witness: Cross cuts Nos. 1011 and 1015 were driven by the Black Rock Company; they were each of them driven to and through the Jersey Blue vein, and a raise was made from the end of 1,015 crosscut up to our 800 foot level. From 1015 drift is drift No. 1010, which was driven for the Black Rock Company, but discloses nothing but country granite. From crosscut 1011 a drift was driven easterly on some rather indefinite irregular seams of manganese. Above No. 1011 crosscut a stope was made at the request of the Black Rock Company immediately north of the raise which comes up from the 1100 of the Elm Orlu. This stope is about one set long and from five to four sets wide. It is immediately above the crosscut; in other words, the crosscut has been carried up for about six floors. In that stope the Jersey Blue vein is shown at its north end or north side, running northwest and southeast.

In the 900 foot level of the Black Rock again the Rainbow lode has been developed and worked and large stopes made to the northeast, and at transit point No. 4 in the crosscut south from the Black Rock shaft we find the Jersey Blue vein again cutting off the Rainbow lode, this time in its continuation to the west. This shaft crosscut was continued at the request of the Black Rock Company as crosscut No. 901, and at a point about 25 feet south of the

316 Black Rock south side line the Pyle strand was again found, and there has a width a little in excess of ten feet. A raise was made up to the 800 foot level, which was shown on the preceding map. A raise also comes up into this level from the 1000 of the Black Rock, and numbered here No. 927.

Q. Mr. Green, on the map just before, on Exhibit 15, there had been no physical connection along the Pyle strand. What in your judgment is the fact as to the strand or vein being shown there in the Elm Orlu 900 and the Black Rock 800 as to being the identical strand?

A. I believe them to be such.

Q. Now, upon this Exhibit No. 16 there is no physical connection

upon the Pyle strand. What in your judgment is the fact as to that extending in a course westerly from 901 crosscut to a connection there?

A. I believe that the Pyle strand can be drifted onto the west from the Black Rock 901 crosscut and connect up with the Rainbow lode on or about 500 feet below our 1000, and a raise could be made to our 1000 on the same strand of the Rainbow lode.

Q. Now, with reference to the north strand, what in your judgment is the fact as to a connection being made between the large north strand of the Rainbow from the Elm Orlu and the strand of the Rainbow in the Black Rock?

A. I believe that drifting and crosscutting from the eastern end of the Elm Orlu mine to the western end of the Black Rock
317 mine will disclose the Rainbow lode practically continuous through there.

Q. That is the north strand of it, the one we have been speaking of?

A. Yes, sir.

Q. Has that been done at any of the levels?

A. Yes, sir.

Q. Which one?

A. Why, it was done on the 800, Exhibit No. 14, and it is done successively on several levels from here down.

Mr. Dickson: I don't think there will be any controversy about that, that the north strand, that portion of it shown in the Black Rock connects through with that portion shown in the Elm Orlu.

Mr. Gray: Very well.

The Witness: From 901 crosscut there has been driven easterly a working named here the 929 lateral. It is in country granite and shows granite—well, I will have to correct that; there is a great deal of vein material running across it in a northwesterly and southeasterly direction from 929 crosscut north to the Jersey Blue vein, and this same vein material shows in the 929 lateral, gradually getting poorer as we go east, and at a point 160 feet east of 901 crosscut the Jersey Blue vein is again found, having a width of about six feet—or about five feet; it is exaggerated here a little—running northwest and southeast, and having a clay gouge on both walls. The
318 lateral continues on easterly and crosses a strand of the Rainbow which is about 18 feet wide, and at its end, near transit point 1027 it intercepts two northwest-southeast faults, one of them, the more southerly of the two, being the same as that which is shown previously on the 800 and 700 foot levels, displacing the vein and ending the stoping ground in the vein below. From 929 lateral a crosscut was driven north to a raise which comes up out of the stopes. In that particular raise at this elevation it is in very badly crushed granite, with little seams of clay running in various directions. A crosscut was driven south, numbered here 931, which crosses a strand of the Rainbow lode, and from 20 to 40 feet south of transit point 1027. At a point 60 feet south of transit point 1027 an east-west vein was encountered, which was cut off to the west by a northwest-

southeast fault which we believe to be the Jersey Blue. West of this northwest-southeast fault the east-west strand of the Rainbow is seen going out of this sill floor stope, and correlates with the Pyle strand as shown near the south end of 901 crosscut.

Q. What is this blue northwest fault just north of the Black Rock north line?

A. Well, that is a northwest-southeast fault, one of the many that exists throughout the length of this area shown. There are a good many of them.

The next map is Plaintiff's Exhibit 17, and is a plan of the 1,100 foot level of the Elm Orlu. This again shows the large east-
319 west Rainbow lode with the Black Rock fault on its south side at the west end, entering it and going along through it to the north side at the east end of the workings.

Q. How wide is the Rainbow shown there approximately?

A. Crosscut No. 1,105 shows it to be about 130 feet in width. The 1,102 lateral encountered a northwest-southeast fault and followed it to the east, and a small block of the Rainbow was found between the Black Rock fault and the northwest-southeast fault. The northwest-southeast fault was faulted by the Black Rock fault, and to the east the Black Rock fault took a sharp turn across the vein and departs from the eastern extremity of the level on the north side of the Rainbow lode. At the east end the Rainbow lode has a width of something over 85 feet, and the Pyle strand is shown running out easterly.

Q. Whereabouts is that; is there any station number?

A. That is shown by the short crosscut from level 19, the crosscut near station 116.

North of the Rainbow lode there are a good many workings, most of which were driven at the request of the Black Rock Company. I believe No. 1,117 crosscut was driven by the Elm Orlu, but the rest of them were driven for the Black Rock Company. In these workings—there are two cross-cuts, as there were on the 1,000, which run north to the Jersey Blue vein, and show it as marked on this
320. map. From this level to the 1,000 of the Elm Orlu a raise was made for the Black Rock Company which started on a very small seam of manganese, and followed it rather flatly to the north for seven floors. Back of the seventh floor it was cut off, and the raise was turned to run up vertically, under instructions from representatives of the Black Rock people, and continued practically vertically from the back of the seventh floor to the 1,000 foot level of the Elm Orlu. From the foot of this raise, a drift, No. 1,122, was driven on a vein which was probably ten or twelve inches wide at the east side of 1,115 crosscut, but which widened as we went west, and in which there was some very good looking zinc ore, which was followed to transit point 161. At this point this seam of ore was cut off very sharply.

Q. By what?

A. By the Jersey Blue vein, and the drift 1,122 became a crosscut and traverses diagonally across the Jersey Blue vein from the hanging to the foot. From 1,115 crosscut first there was driven 1,116

drift. This crossed a small seam of about 8 inches of manganese and went out into the country rock. Later a new drift or crosscut was started from transit point 127 to the southeast on this eight inch seam of manganese, which followed to the southeast and is dislocated or displaced by every little seam or crack that crosses the drift. At station 128 a crosscut was driven north, which is entirely in granite country rock. Near station 129, No. 1,120 drift was driven
321 east, and that also was a crosscut through the granite country rock. Finally drift or crosscut No. 1,121 was made, which connected through from 1,120 to our 1,114 drift along the hanging wall of the Rainbow lode. This 1,121 crosscut shows two minor fault seams which do not seem to be of any importance. From the 1,100 of the Elm Orlu to the 1,000 of the Elm Orlu a raise was made from a point near transit point 140. This raise followed the Rainbow lode up to the 1,000, and immediately northeast of the raise up to the ten a raise comes from our 1,200 up to our 1,100 on the Rainbow lode continuously.

Q. The next level is the 1,000 foot Black Rock?

A. This is marked Plaintiff's Exhibit 18. This level shows the big stope on the Rainbow lode faulted by the northwest-southeast faults.

Mr. Dickson:

Q. Is that what is called the Deadwood fault?

A. I believe this was called the Deadwood fault; I don't know as to that. The Deadwood fault has a much larger throw than the Jersey Blue fault but is the same type and belongs to the same series of northwest-southeast veins. It is turned in the same manner—it in turn, in the same manner as the Jersey Blue, is faulted by the Black Rock fault. The shaft crosscut runs to the south and crosses first the Black Rock fault then through the Rainbow vein to where it is cut off and displaced by the Jersey Blue vein. The crosscut continues on south to a raise which was made by the Black Rock people and described this morning by Mr. Clark. The crosscut con-
322 tinues across the vein found in this raise and shows the Pyle strand of Rainbow having a width of about eighteen feet. A short drift was run from this 1,001 crosscut numbered here 1,014. This drift was run to the west and a raise was made for the Elm Orlu Company on the Pyle strand up to the 900 of the Black Rock.

Q. As developed there, where was the Pyle strand with reference to the east end line of the Elm Orlu?

A. Measuring along the side lines, the common side line of the Black Rock and the Elm Orlu, the Pyle strand of the Rainbow is 110 feet westerly from the east end line of the Elm Orlu claim.

Mr. Dickson: How far vertically is that beneath the surface, the Pyle strand there, at that level; 1,000 feet or more?

A. It is not quite 1,000 feet.

Mr. Dickson: I only want to know approximately.

A. I can give it to you exactly. It is 1,007 feet below the surface, below the collar of the Black Rock shaft. The surface immediately

over here is probably a little lower than the collar—no, it is practically the same elevation as the collar.

Mr. Gray:

Q. Where was the Pyle strand as developed on this crosscut with reference to the south line of the Black Rock?

A. It crosses the south line of the Black Rock at that crosscut.

323 Q. What is its dip there?

A. Its dip is to the north, about seventy-eight degrees.

Q. You may proceed?

A. The stope coming up from the 1,100 Black Rock and immediately under this level shows the Jersey Blue cutoff of the Rainbow exactly as it is depicted upon this map and the drift No. 1,002 west follows the Rainbow and the Jersey Blue to a point twenty feet west of station 497, where the Jersey Blue is displaced by the Black Rock fault which crosses the drift in a southwesterly direction. The displacement is very small there and the Jersey Blue vein is found again continuing in its northwesterly direction out of the north side of 1,002 drift, through 1,004 crosscut and into 1,019 drift. It is followed on the west in 1,012 drift and above 1,012 drift and for a distance of I think 180 feet it was stoped.

Q. What is the thickness of the Jersey Blue as disclosed in the 1,002 west crosscut just north of the Black Rock fault?

A. It is not over a foot thick.

Q. What is its width as disclosed in the 1,004 crosscut?

A. It is about eight to ten inches there.

Q. What is its width as disclosed in the stope east of the Black Rock fault?

A. It was about four feet in width there.

Q. You may proceed?

A. The Jersey Blue vein was followed north a distance of
324 little more than 250 feet, northwest from crosscut 1,010. And as an aid to determine the identity of the Jersey Blue vein on either side of the Black Rock fault the displacement of which has been called the Deadwood vein is similar and in a similar direction— .

The Court: What is that?

A. As an aid to cor-olating the two strands of the Jersey Blue on the opposite—on opposite side of the Black Rock fault we have similar conditions of the displacement of the Deadwood fault by the Black Rock fault near station 922.

Mr. Gray:

Q. The Deadwood fault being also one of the northwest fault series?

A. Yes, sir.

The Court: Well, are they both displaced in the same direction?

A. Yes, sir—no, they are not displaced in the same direction.

Q. What is the dip of the Jersey Blue?

A. The Jersey Blue is dipping at this point almost vertically. The angle is quite acute.

Mr. Gray:

Q. The Deadwood is dipping?

A. The Deadwood is dipping northeasterly.

Q. That accounts for the difference in the displacement, one being displaced easterly and the other westerly?

A. Yes, that would partly account for it.

Q. In other words, on the south side of the fault, Mr. Green, the Deadwood is faulted westerly?

325 A. It is displaced westerly about twenty feet.

Q. The other shows a slight displacement easterly?

A. About seven or eight feet at this point, but the displacement of the Jersey Blue by the Black Rock fault is various. It may be east and it may be west according as the dip of the Jersey Blue changes from north to south but the angle is very acute by which they approach one another, and the differences are magnified for that reason—the difference is not magnified but they vary considerably for that reason.

Q. And to the east is shown the workings upon the Black Rock?

A. Yes. The next map is Plaintiff's Exhibit 19 and shows in plan the 1,200 foot level of the Elm Orlu and the 1,100 foot level of the Black Rock. In the 1,200 foot level of the Elm Orlu the lateral follows along the Black Rock fault to crosscut 1,027 which is the last point I have been able to see it, and 1,202 drift is now and has been for over a year inaccessible. Nearest crosscut 1,229 we find what has been stoped and worked as a copper vein, which, similarly to the levels above follows along the Black Rock fault for a ways, and departing from it turns to the southeast, and has the same general northwest-southeast strike as other fault veins of the northwest-southeast series. The Rainbow lode was developed and crosscuts from this lateral and very large stopes have been made in an east and west direction within the Rainbow lode, which has a maximum width of about 125 feet from this level. This map is not

326 complete, I don't know why, but the Rainbow lode should continue on entirely to 1,224 crosscut where it is faulted by the Black Rock fault. I will just roughly fill in some of the things that were left off. At the eastern end of the Elm Orlu workings on this level there was a crosscut running north and south of No. 1,221. In this crosscut we found the Black Rock fault along the south side of drift 1,224 in which drift the Rainbow lode comes to a point on the north line of the Black Rock fault. South on this 1,221 crosscut at a point about forty feet south of the Black Rock fault is another strand or seam of the Black Rock fault, and a drift was driven along it to the eastward, No. 1,228. South from 1,228 drift a drift extends to the west along the Pyle strand of the Rainbow. The Pyle strand in this drift has been stoped at the east and seven floors high and at the west end up to the 1,100 level.

Q. Will you give me the numbers that are there; are there some station numbers there?

A. That stope is from 1,204 drift. The Pyle vein is slightly faulted by a northwest-southeast fault at the point where it crosses 1,221 crosscut, but shows continuing on easterly from the east line of this crosscut. The 1,228 drift—in 1,228 drift about twelve or fourteen feet of the *the* Rainbow was found and crosscut and we are now drifting as fast as we can on a continuation of 1,228 drift with the expectation of connecting up with the Rainbow lode found on the 1,100 foot level of the Black Rock.

327 Q. Following the north branch or strand of the Rainbow; in that way?

A. It is following an interior strand of the Rainbow. There is more Rainbow north of the Black Rock fault in there (indicating). From 1229 drift crosscut No. 1235 was driven southerly and a drift, 1230, was driven along the southern boundary of this particular strand of the Rainbow. At a point about fifteen feet from station 159 an east-west branch of the Rainbow was found, and again over at transit point 158, and these were followed to a connection on the east, in drift 1232.

The Witness: Drift No. 1232 is now running—it is about south 80 east to the top of a raise shown at the end of drift No. 1106 on the 11th level of the Black Rock.

Q. And that is upon what?

A. This raise is upon the Pyle strand.

Q. What is that drift No. 1106 that you spoke of upon?

A. 1106 is the one I just said is on the Pyle strand, also the raise from it is on the Pyle strand of the Rainbow.

The 1121 crosscut had been driven north to the Jersey Blue, as also had crosscut 1217. 1217 was made at the request of the Black Rock Company, and also the drifts shown here as 1216, crosscuts 1223, 1225, 1222, 1218, 1233 and 1226. From crosscut 1221 drift 1216 follows along a small manganese seam. I would like

328 to correct this map here; I find that whoever finished it colored it in wrong.

Q. Yes. You can state what it is.

Mr. Gray: I will ask permission to withdraw that particular map and have it colored according to his idea.

Mr. Dickson: No objection.

Mr. Kremer: He can do it right there it seems.

(Witness marks on map with colored pencil.)

The Court: State what in the record you desire, and letter it in some way or indicate it, and you can color it afterwards.

The Witness: Well, drift No. 1216 followed along this small manganese vein to transit point 123, and there was slightly faulted by a northeast-southwest fault which I have marked in blue on this map, running northeast and southwest through cross cut No. 1233. At transit point 123 the manganese seam was cut off by this small northeast-southwest fault which is widened to two or three feet, with

a great deal of fluorite, and has apparently been displaced, and is again found in drift 1226. At the request of the Black Rock 1233 crosscut was run from the end of drift 1226 and followed out on a manganese quartz vein, which at transit point 137 was cut off by a northwest-southeast vein. The drift was continued across this northwest-southeast vein, and from transit point 138 to its face, a distance of 120 feet, drift 1226 followed the north wall of the Jersey Blue vein.

329 Q. That is the northwest-southeast vein you have been referring to?

A. Yes. Easterly from 1211 crosscut at the request of the Black Rock Company we drove 1216 drift. Right at the intersection of 1211 crosscut and 1216 drift there is quite a lot of zinc ore, possibly three and a half to four feet wide. This was followed in drift 1216, and was left near transit point 94, and drift 1216 continued to crosscut 1221. Crosscut 1225 and 1223 were driven from this drift, each of them showing the granite country rock. Later crosscut 1222 was started, and that had at its beginning a considerable amount of zinc ore, but left that, and crosscut a badly broken area till it reached the hanging wall of the Rainbow lode. Then crosscut 1218 was driven, and that followed along the north side of this good zinc ore to a fault ten feet south of transit point 94, where it is cut off by a northeast fault seam. 1218 crosscut was also continued nearly to the hanging wall of the Rainbow lode. Drift 1227 was driven from crosscut 1222 easterly for about 25 or 30 feet along the hanging wall of the Rainbow lode.

Q. What is the dip of that wall of the Rainbow lode at that place, the hanging wall?

A. The hanging wall there is very steep above the drift at the east end. At the west end it is quite flat, and has a dip of about 57 or 58 degrees in crosscut 1205. In 1201 it is almost vertical at that point.

By the Court:

330 Q. This vein running down from the Jersey Blue that you have described, the zinc ore, down to the hanging wall of the Rainbow, to what do you assign that; as part of the Rainbow?

A. Yes; it does not quite reach the Rainbow at this point; it becomes very badly broken up.

Q. Is that what you said you would color blue?

A. No, sir; this small flat northeast-southwest fault I have colored blue.

The 1100 foot level of the Black Rock shows the northeast-southwest stopes on the Rainbow, and they are very large, very wide and practically continuous from where it is cut off on the west by the Jersey Blue to the eastern extremity of this map, where it crosses the north side line of the Black Rock claim. In this level the so-called Deadwood vein is shown again cutting off a block of the Rainbow in its western continuation, and cutting through the Rainbow on the south side of the Black Rock fault as it was above.

By Mr. Gray:

Q. Is the Jersey Blue shown in there on the south side of the Black Rock fault?

A. Yes, sir.

Q. Whereabouts?

A. By the blue line through drift 1103 and drift 1102.

Q. What is its thickness there?

A. Why, for the length of that drift 1103 I do not know that I can describe its thickness; it is an old working, and the stopes
331 were made before I saw it first. The stopes end going west against this seam.

Q. Proceed.

A. In 1102 drift the stopes continued to the westward for about 50 feet, and end against a northwest-southeast fault, which I believe to be the Jersey Blue. The drift continued on to the west, and it is all in vein material, but west of the Jersey Blue vein it is very lean, consisting almost entirely of quartz and manganese in the altered granite. At transit point 900 the drift turned to the northwest, and crosses a strand of the Rainbow and three strands of the Black Rock fault, between which are also strands of the Rainbow. North of the north strand of the Black Rock fault the drift continues on to the northwest for a short distance, and then turns to the southwest, and that is in a very badly broken up and faulted area. At the request of the Elm Orlu Company the Black Rock people drove crosscuts 1131 and 1104 to cut the Pyle strand of the Rainbow. In crosscut 1131 at a point 40 feet south of transit point 514 we found the hanging wall of the Pyle strand and crosscut it for a distance of 15 feet, the Pyle strand being 15 feet wide in that crosscut. A drift was made easterly on the Pyle strand to a connection with the raise from the stopes above the 1200 up to the 1000 Black Rock, the same raise mentioned by Mr. Clark. A drift was also driven westerly along the Pyle vein, which holed into a drift which was driven westerly from crosscut 1104, and this drift was continued on
332 westerly from crosscut 1104 for a distance of about 155 feet. In the face a raise has been made up to the same elevation as the 1200 Elm Orlu, and within a day or so there will be a connection from the top of that raise through and into our 1200 foot level. To the eastward 1141 drift was driven, as I said, to a connection with the raise from the 1200, and in order to get around this raise, which was filled, we had to run a semi-circular drift around it, which is still known as 1141 drift, and near transit point 1077 we again encountered the foot wall of the Pyle strand and followed it eastward to a crosscut which I will mark "Y." At crosscut Y or at the point from which the crosscut was driven at Y, we found the Pyle vein cut off by a northwest-southeast fault, and slightly displaced along that fault, and a crosscut was driven northerly across the Pyle strand connecting with an old crosscut No. 1105. The Jersey Blue is seen departing from this 1141 drift to the southeast, and is again found near the face of 1115 crosscut, where it is about

three feet in width. This 1115 crosscut *shown* also two other northwest-southeast faults of the same series as the Jersey Blue.

Q. The Pyle strand as disclosed throughout that drift and along it is dipping in what direction?

A. It is dipping to the north. In the western face of 1106 drift the dip is rather flatly to the north, 64 degrees, but as you go east the dip becomes much steeper, and at the raise it is close to 80 degrees to the north; between 75 and 80.

333 Q. What is the character of the material disclosed in these crosscuts from 1103 to drifts 1141, that is, between the 1103 and the Pyle?

A. At the east end of 1103 it is altered granite. In 1131 crosscut the first ten feet is in quartz, vein material, but from this point ten feet south of station 514 to the Pyle vein it is granite. Crosscut 1110 is all granite except a small seam which crosses it about parallel with the Jersey Blue, and 1104 is practically all granite, with the exception of one small seam of quartz.

Q. How about over further to the west where the Pyle shows up in the 1100 of the Elm Orlu and also in the 1200 of the Elm Orlu, what is the character of the rock and material between the Pyle and the northerly strand of the Rainbow?

A. In 1221 crosscut?

Q. Well, I wanted to get at the character of the rock as disclosed in these crosscuts and also on the 1100 foot level of the Elm Orlu?

A. Well, in the 1100 it is all very good vein material; it is all quartz and manganese. In this crosscut it is very highly altered granite with more or less quartz and manganese scattered irregularly through the granite.

Q. Is there anything else?

A. Nothing, except that these northwest-southeast veins interrupt the Rainbow vein and displace it.

By the Court:

334 Q. Where are the ore bodies that are in dispute in this case?

The Court: I asked that of the attorney.

Mr. Gray: They extend to the easterly line of the Elm Orlu claim. We claim northerly through that line, and from there to the westerly end under the Black Rock part of the way and under the Admiral Dewey and the Jersey Blue further west.

The Court: They are in dispute the entire length of the Elm Orlu?

Mr. Gray: Under the Elm Orlu, yes, sir.

The Court: Very well. I would assume that all this that the witness is testifying to is material from your standpoint?

Mr. Gray: Yes, sir.

By Mr. Gray:

Q. Proceed?

A. Plaintiff's Exhibit No. 20 shows the 1300 foot level of the Elm

Orlu. This level again shows the very large east-west Rainbow lode, and along its southern boundary the copper vein, which is somewhat faulted, but later to the southeast becomes a northwest-southeast fault vein. In crosscut 1317 we find the Black Rock fault very clearly defined, as we do also in crosscut 1307, south of 1302 drift about 30 feet.

Q. It has crossed through the Rainbow there?

A. It is crossing through the Rainbow now, and the next map shows it crossed to the Rainbow. 1309 crosscut was driven out of the hanging wall of the Rainbow, and 1303 was driven out to and
335 beyond the hanging wall of the Rainbow. The hanging wall is well shown in 1318 drift, and again in 1305 crosscut.

Q. It is dipping in what direction there?

A. There it is dipping north, quite flatly to the north. From there up to the 1200 and the raise near transit point 52 has been driven continuously on the vein, and just along the hanging wall from the 1300 up to the 1200 Elm Orlu. 1305 crosscut shows continuous vein up to a point eighteen feet north of transit point 65. The vein has been stoped and will be stoped at the east end for a width close to 180 feet. It has already been stoped at that end for a width of 140 feet.

Q. East end of what?

A. East end of the level shown on this map. The stope at present is about 140 feet in width and has a length of about 45 feet at the south end, but later we expect to be able to stope the rest of the area north of this drift 1302 clear to hanging wall.

Q. Where is that stope with relation to the south line of the Black Rock?

A. That is mostly south of the south line of the Black Rock.

Q. Some portion of it?

A. There is a very small corner over the Black Rock line.

Q. The line runs through the stope, in other words?

A. Yes. It was stoped by arrangement between the two companies I believe. From 1305 crosscut, when I first saw this
336 level, there was a drift 1310, which went out to a raise from the 1400 Elm Orlu up to the 1500 Elm Orlu and connects with the 1200 of the Black Rock. This 1310 drift shows a small northwest-southeast fault, which follows or encountered rather in a drift now entirely obliterated by the stoping, as far as the map is concerned.

Also from there, was a drift from the 1305 crosscut clear over to the 1307 crosscut practically along the side line of the Elm Orlu. This was along the north wall or the hanging wall of the Rainbow lode and encountered the northwest-southeast fault at a point about one hundred feet east of 1305 crosscut to where the hanging wall of the Rainbow lode was displaced, and a short distance, about twenty feet along the line of the small fault and was again—as the hanging wall was again followed on east at the request of the Black Rock Company we then drove drift 1320 which began in some vein, good zinc ore, and follows that zinc ore to transit point 103 where it is cut off by that same northwest-southeast fault that crosses 1003 drift.

1320 drift from station 103 follows to the northwest on this small northwest-southeast fault which is practically parallel to the Jersey Blue. 1307 crosscut is drifted north to the Jersey Blue and in the northerly end of that crosscut the Jersey Blue is found to have a width of something in excess of eight feet. A raise from the Black Rock 1200 has come up through the Jersey Blue and into that crosscut.

Mr. Dickson:

Q. How much is the distance of the north wall of the Elm
337 Orlu as shown on that Exhibit 20 and the foot wall of the Jersey Blue?

A. The north wall of the Rainbow and the north wall of the Jersey Blue?

Mr. Dickson:

Q. The north wall of the Jersey Blue and the foot wall of the Jersey Blue. I understood you to say this represents the north wall or the hanging wall of what you spoke of as the Rainbow?

A. Yes.

Q. I suppose the south line of that would be the foot wall of the Jersey Blue, would it not?

A. For about ten hundred feet it is the hanging wall.

Q. Then the distance between the hanging wall of the Jersey Blue and the hanging wall of the Rainbow on that level?

A. A distance of sixty feet between the north wall of the Rainbow and the south wall of the Jersey Blue. At this particular stage—the 1,200 foot level of the Black Rock shows the east-west Rainbow lode from its western extremity at crosscut 1234 east to the limit of this map, something over sixteen hundred feet. It also shows the Black Rock fault along the south side, at the west end of the vein crossing through it and going along its north side for some disance to a fault block which we recognize as having been faulted to the north by the Deadwood fault. In the face of 1234 crosscut we found the Jersey Blue vein and in drift 1238 it has been followed west from crosscut 1218 and to the east to crosscut 1208. It
338 leaves crosscut 1208 to the southeast, faults the Rainbow lode in drift 1210. The Jersey Blue is found again in drift 1202, which follows it for a distance of about eighty feet, and again the Jersey Blue is found in 1201 crosscut, where it cuts off the big stopes from 1203 drift. The raise which is said to come up into the ten hundred Black Rock starts from the 1200, in 1203 drift, about 30 feet east of 1201 crosscut.

Q. That is the raise that Mr. Clark and Mr. Pyle identified as the raise they went up?

A. Yes, sir.

Q. Is that marked so that it can be identified

A. No, I don't know the number of it.

Q. Just put some sort of a mark on there that will identify it.

A. I will mark that "Raise X."

Q. Is the Jersey Blue shown to be displaced on that level, faulted?

A. Yes, displa[illegible] as shown by the map.

Q. The red is shown extending clear across the northside line of the Black Rock and thence on southwesterly across the south line of the Black Rock. State whether or not there are continuous or practically continuous workings in the vein from the Elm Orlu across the south line, clear across the Black Rock claim.

A. There are continuous workings throughout that distance. Plaintiff's Exhibit 22 shows the fourteen hundred foot level of the Elm Orlu and the 1,300 Black Rock. The Elm Orlu level
339 consists of the northeast crosscut which cuts the so-called copper vein about 160 feet from the shaft and cuts the Rainbow vein at Raise 1406. It shows the Rainbow at that point to be about 35 or 36 feet wide. Immediately north of drift 1306 the crosscut turns to the north or more northerly and cuts the Jersey Blue at a point about 35 feet north of transit point No. 8. A raise has been made from the 1400 Elm Orlu up to the 1300 Elm Orlu, and a raise in the Rainbow lode, and another raise comes up from the 1500 to the 1400 in the Rainbow lode for part of its way. The copper vein has been drifted in a rather semi-circular shape.

Q. And you have that shown in blue also?

A. Yes, sir.

Q. That is one of the northwest?

A. It is one of the northwests?

Q. And the green there represents what?

A. In the 1403 crosscut, the Black Rock fault is found going through the 0 in 1403, and displacing the copper vein some thirty-five or forty feet. The 1300 Black Rock shows the break northeast and southwest at the east end and east-west at the west end of the Rainbow lode. This has been stoped for a short distance at the west end and—that is a short distance vertically at the west end but continues to about the 1200 Black Rock on the east. The vein extends on interruptedly and is stoped almost uninterruptedly for the whole length shown on this map.

Q. Shows the Jersey Blue coursing through the vein there,
340 through the Rainbow from the station 428 and entirely to station 263?

A. I was able to trace the vein on the first floor of this stope as shown on this map from the west end of the sill end through the first floor, clear on east to near where it would be cut off by the Black Rock fault or displaced by the Black Rock fault.

Q. That is the Jersey Blue?

A. Yes.

Q. Now, is there anything else in there?

A. Yes, there is another northwest-southeast fault immediately south of crosscut 1325 and what has been referred to as the Deadwood on the west.

Q. The Black Rock fault is shown again?

A. The Black Rock fault is show again and going in its usual direction, northeast. Plaintiff's Exhibit 23 shows the 1500 foot level of the Elm Orlu. This level consists of a northeast crosscut from

the Elm Orlu shaft, and in that crosscut about 320 feet from the shaft was found the copper vein, and on, about 530 feet from the shaft we found the foot wall of the Rainbow lode dropping north and the crosscut has been turned to a northerly direction and in the crosscut at transit point No. 7 we found the Jersey Blue vein and we found it there cutting through the Rainbow. The drift was drift No. 1504 from the Jersey Blue a little south of west along the north boundary, north wall of the Rainbow lode. There the Rainbow shows a width of about fifty-five feet. The copper vein was
341 followed in drift 1503, was faulted and again picked up in drift 1502 where it was again faulted by the Black Rock fault and apparently was running south, but we know from the adjoining lode that it turns again and runs on its accustomed course northwest and southeast. The 1502 drift was continued and a crosscut 1509 was driven north for about 200 feet and at a point about 52 or 53 feet north of this drift 1502 in 1509 crosscut we found the Black Rock fault. At the east end of 1502 drift crosscuts were driven north and south, 1513 being southwest or passing unaltered granite and crosscut 1511 north in altered granite and through some breaks of probably Rainbow ore to a point from the 1400 foot level of the Black Rock. At a point about 155 feet north of the 1502 drift the Black Rock fault was again encountered and about fifteen feet north of station 47 we found the main Rainbow and from that point for a distance of about 95 feet it has been crosscut by No. 1511 crosscut and this stope is the Black Rock. On this 1511 crosscut at a point about 65 feet north of station 47 there was a strong fault vein which is the Jersey Blue cutting through the Rainbow entirely within the Rainbow at this point but distinguishable still as the Jersey Blue vein.

Q. Is that Exhibit No. 24 the 1400 level of the Black Rock?

A. Yes, sir. Exhibit No. 24 shows the plan of the 1400 Black Rock. Here again the Rainbow lode has been stoped almost
342 continuously—quite continuously from the west end line of the Black Rock to the eastern end of the map, a distance of over 1,300 feet—over 1,400 feet. In this level the Rainbow is shown as usual in red, and south from the shaft we first find the Black Rock fault going across the Rainbow. This Black Rock fault is seen again in the stopes from 1407 drift and goes along the stopes and through them, and out at the north side at about transit point 653. The Deadwood vein is seen again crossing the Rainbow, and at the west end we find the Jersey Blue vein entirely within the Rainbow, and can see it, or could see it at one time on this level at the west face, at the mouth of 1410 crosscut in 1404 drift near station 247, and now again in a crosscut about 25 feet east of 1406 crosscut which has been recently run for the Elm Orlu Company.

Q. Give it a name or a letter or number?

A. It is 1416, but it is not very clear. I will mark it plainer. 1416 crosscut shows the Jersey Blue vein again nearly 40 feet south of the timbers in the drifts—south of the center of the drift, that is where I took my measurement from; or about 30 feet south of the

mouth of the crosscut where it leaves the stope. This crosscut was carried over to 1402 drift, and 1402 drift showed at that point nothing but the Black Rock fault. In 1401 crosscut at station 72 we find the Jersey Blue vein again running northwest and southeast, and notice that the stopes from 1402 drifts, which are now and have been inaccessible ever since I have been here, terminate very
343 close to where we believe the Jersey Blue vein cuts the vein off to the west.

Plaintiff's Exhibit No. 25 shows the 1600 Elm Orlu and the 1500 Black Rock. This level, the 1600 of the Elm Orlu, has developed so far only the copper vein and the Black Rock fault. The Black Rock fault faults the copper vein and displaces it a small amount. The 1500 of the Black Rock shows the Rainbow lode, but only partly developed on this level. It, however, has been followed for about a thousand feet east and west in the working. The workings also show the Black Rock fault, and at least one northwest-southeast fault which displaces the vein.

Q. Is the Jersey Blue shown there any place?

A. No.

Q. Where would it appear if it was shown?

A. It would lie on the south.

(Another plat of this series in the wheel marked Plaintiff's Exhibit No. 26.)

The Witness: Plaintiff's Exhibit No. 26 is a plan of the 1700 Elm Orlu and the 1600 Black Rock. The 1700 Elm Orlu shows the copper vein, and a long crosscut has been driven recently to the northeast. I have not been in that crosscut, but other people have, and will testify. The 1600 of the Black Rock showed three strands of the Rainbow lode and the Black Rock fault cutting down across. The Jersey Blue does not show on here, nor has the Elm Orlu crosscut on the 1700 reached the Rainbow.

344 Q. Or the Jersey Blue?

A. I don't know whether it has or not.

Q. You have shown there in the plan all of the principal workings in these two mines and all that are accessible, Mr. Green?

A. Yes, sir.

Q. Will you just briefly follow the Rainbow vein in the Elm Orlu from the 500 Elm Orlu downward to the last level; state whether or not it can be continuously followed upon workings from the 500 foot level downward?

A. It can be followed continuously downward from the 500 Elm Orlu to the 1500 Elm Orlu.

Q. On ore all the way?

A. On ore and vein.

Q. You spoke of being able to distinguish the Jersey Blue as it passed through the Rainbow on two of the lower levels in the maps?

A. Yes, sir.

Q. Will you just explain to the court how you are able to distinguish the two?

A. The Jersey Blue within the Rainbow vein, just as it is outside of the Rainbow, has a very distinct gouge on one wall always, and sometimes on two; and the banding of the vein within the Rainbow is parallel—that is, that part of the vein belonging to the Jersey Blue the banding is parallel to this Jersey Blue fault gouge, whereas the banding in the Rainbow is generally parallel to the Rainbow
345 itself; and on these two levels in particular the banding is rather flat to the north in the Rainbow, whereas the banding of the Jersey Blue is very steep and almost perpendicular.

Q. Mr. Green, from your investigations and examinations and acquaintance with that property and the workings through which you have been and which you have described, the stopes through which you have examined between these workings, and from all the information which you have concerning the properties, taking into consideration your acquaintance with the vein structure of the district, will you state to the court what in your judgment the relative ages and the structural relations of the veins are, which you have been describing?

A. I find that the workings in these two mines disclose an east-west vein of great age, which has been faulted by northwest-southeast veins junior to the east-west veins, and both of these are again faulted by a northeast-southwest fault conforming to the general structure of the Butte camp.

Q. With reference to the Pyle strand, will you now trace it—for what distance is it traceable both upon its dip and upon its strike; from what level to what level?

A. Well, I could not give you exact measurements east and west on the length.

Q. No, but generally?

A. Well, it is traceable practically through from the 1200, from the stopes on the Pyle strand near the 1200, easterly to the head of a raise coming up from the 1106 drift, and through that
346 raise through 1106 drift on easterly to where it is cut off or displaced by the Jersey Blue.

Q. That is right near where it connects with the main ore bodies?

A. Yes, some 50 or 60 feet east of the raise which followed it up from their stopes on their 1200.

Q. How high up have you followed that and been able to distinguish and follow it directly?

A. I have followed it up from the thousand of the Black Rock to within a very short distance of the 500 of the Elm Orlu, which is something over 600 feet.

Q. You have spoken of three systems of veins that you have observed in this property. To which does the Rainbow belong?

A. I said it belonged to the most ancient, the east-west system.

Q. The Jersey Blue?

A. The Jersey Blue belongs to the northwest-southeast system, which is akin to the Blue Vein system; and the northeast-southwest Black Rock fault is akin to the Bell fault and the Blue Jay fault.

By the Court:

Q. Which one do you class as the youngest?

A. The youngest is the Black Rock fault, the Jersey Blue next, and the Rainbow the oldest.

Q. How far to the northwest are you able to trace the outcrop of the Jersey Blue?

347 A. Why, I have only traced it as far as the railroad track to the northwest.

Q. Just where is that?

A. That is about 250 feet northwest of the Jersey Blue shaft.

Q. How far north of the outcrop of the Rainbow is that outcrop of the Jersey Blue?

A. At the railroad?

Q. Yes?

A. It must be 800 feet; I don't know exactly, but I should judge it is about 800 feet.

Mr. Gray: That is all.

Whereupon the further hearing was adjourned until Wednesday, October 20th, at 10 A. M.

Wednesday, October 20th, 1915—10 o'clock a. m.

Trial resumed pursuant to adjournment.

FRED T. GREENE, resumed the stand for

Cross-examination.

By Mr. Dickson:

Q. Mr. Greene, what is the month and year when you last came to this district to Butte; you said 1913, I think; what time in 1913?

A. In December, 1913.

Q. That was the month when you became employed by the Elm Orlu Mining Company or the Clark-Montana Realty Company, whichever it was?

A. Yes, sir.

348 Q. For what purpose were you employed; what service did you perform?

A. I was to study the structure of the mine and look after the development work.

Q. With a view to this litigation, which was then anticipated but the suit not then commenced?

A. Yes, sir.

Q. From that time to the present how continuously have you been employed?

A. I have been employed almost continuously.

Q. And what proportion of the time, speaking generally, if you cannot specify precisely—what portion of the time have you de-

voted to an investigation having for its object to ascertain what the merits are as to this controversy?

A. During the year 1914 about half the time, and during 1915 probably nearer two-thirds of the time, and the last two months all of the time.

Q. One of the first objects, I suppose, in fact the chief object of your investigation was to ascertain to your own satisfaction at least whether the ore bodies in controversy in this action belonged to a vein which has its apex in the Elm Orlu claim, and if so, how that claim was laid upon that apex?

A. Yes, sir.

Q. And you have devoted, I judge, something like a year on that branch of the investigation?

A. I should say so.

349 Q. Is the case a very complex one, a very difficult one geologically?

A. The general geology is not at all difficult.

Q. Did you do any of the surveying, any considerable amount of surveying?

A. I did not do any surveying.

Q. You did not do any of the map making; that was done by a draftsman, and the geology put on under your direction and other experts on your side of the case?

A. Yes, sir.

Q. So that for nearly a year of your investigation your time has been devoted to an investigation carried on with a view to determining to your own satisfaction whether the ore bodies in controversy in this suit lay in a vein which had its apex in the Elm Orlu?

A. Yes, sir.

Q. What was the most easterly surface working within the boundaries of the Elm Orlu when you entered upon your employment in December, 1913?

A. The most easterly was called the east shaft, and the workings from it.

Q. Will you be good enough to point it out on this Exhibit 4?

A. The east shaft is located about 250 feet west of the east end line.

Q. Now, that was recent work evidently from its appearance, was it not, in December, 1913?

A. It was apparently done during the last two or three years.

350 Q. I think Mr. Pyle said he did that in 1913?

A. Yes, sir.

Q. Now, what was the most easterly work within the boundaries of the Elm Orlu that appeared to be old work, not done within a year or such a matter?

A. Why, the most easterly work at that time—old work?

Q. That appeared to be old work?

A. How old?

Q. Well, not done within two or three years?

A. Well, there was no work at that time that you could gauge very well as to how long it had been there; it might have been there a year or five or six years from its appearance at that time.

Q. With your large experience, Mr. Greene, couldn't you get any nearer to that in judging of the age of a surface working, whether it would be a year or five years old?

A. The surface openings do not vary in two or three years to a great extent; that is the difference between two and four years is not great.

Q. Well, apart from the east shaft what was the most easterly surface working within the boundaries of the Elm Orlu in December, 1913, regardless of age?

A. Trench F-1, F-2 and F-3.

Q. Apart from the east shaft, those trenches were the most easterly surface workings, whether new or old, within the boundaries of the Elm Orlu in December, 1913?

351 A. Yes, sir.

Q. What was the distance from those trenches to the east end line of the Elm Orlu?

A. Roughly, 650 feet.

Q. All the surface work in the boundaries of the Elm Orlu east of these trenches that has been done since 1913 has been done under your direction?

A. Not entirely, no.

Q. Principally so, chiefly so?

A. Yes, chiefly.

Q. Was all of it done either under your direction or under the direction or suggestion of one or another of the mining experts of the Elm Orlu Mining Company?

A. Yes, sir.

Q. In December, 1913, when you took charge or when you began your investigation what, if any, underground workings were there within the boundaries of the Elm Orlu extended downward, vertically, eastward of the trenches F-2 and F-3?

A. There was one level then commenced, a shaft at the depth of about sixty feet below the collar.

Q. At the east shaft?

A. Yes, sir.

Q. And how far had that level been driven or that drift?

A. That had been driven northerly and southerly clear across the Elm Orlu claim.

Q. That, of course, was recent work?

A. Yes.

352 Q. Had that appearance?

A. Comparatively recent work.

Q. Been drifted from that shaft and thereafter drifted after the shaft was sunk?

A. Yes, sir, surely.

Q. If I understood your direct testimony, your claim is, or your opinion is, that the Black Rock fault was a post mineral fault, later

than the Elm Orlu vein, and also later than what you call the Jersey Blue vein?

A. Yes, sir.

Q. And faulted or dislocated both of them at places?

A. Yes, sir.

Mr. Dickson: I don't think, so far as that is concerned, there will be any controversy.

Q. It is also your opinion, or you have reached the conclusion that the Jersey Blue vein so designated by you, was later than the Elm Orlu vein and faults or displaces the latter at various levels?

A. Yes, sir.

Q. What is the difference in the character—I don't mean quality now, grade of ore or magnitude of it—but what, if any, is the difference as to the vein material and quartz and ore, where there is any, in the Jersey Blue vein socalled and the Elm Orlu vein?

A. The same minerals are present in both veins but——

Q. Anything in the mineralization, the character of the mineralization, nature of it, to indicate that they were formed at different ages?

353. A. Yes, the arrangement of the minerals in the two veins.

Q. That is where they cross, where one intersects the other?

A. No, throughout.

Q. Do you mean difference in structure, banding or what?

A. Yes.

Q. Does the fact that there is a difference in the two mineral veins in that particular, the structure or banding, throw any light upon the question of which is the older and which the younger of the two?

A. At the point of intersection, yes.

Q. But only at the point of intersection?

A. Outside of the point of intersection, no.

Q. Outside of the point of intersection, is there anything in the mineralization of the two veins to point to the conclusion or tend to show that the one is younger than the other?

A. As far as the minerals are concerned only in the Jersey Blue, throughout the greater portion of the development has been barren, which is not true of the Elm Orlu.

Q. The Elm Orlu no doubt was a larger vein, more valuable vein containing ore bodies at greater magnitude and greater extent, but that would not throw any light upon the question of whether it was an older vein than the Jersey Blue vein, would it?

A. If they did not come together anywhere, why, you
354 could not be sure as to these two veins, except that it is possible, through the fact that the Jersey Blue vein does fault the Elm Orlu, that there is a difference in each.

Q. Of course, if that be true, if your conclusion in that regard be true, then the Elm Orlu vein is faulted and displaced by the Jersey Blue vein, it follows of necessity that the Jersey Blue is the younger of the two. But I will come to that afterwards. Now, apart from the fact as you claim it to be, of the faulting of the Elm

Orlu vein by the Jersey Blue vein, is there anything to indicate or throw any light whatever upon the fact that the Jersey Blue vein is younger than the Elm Orlu?

A. Yes, I think the structure of the Jersey Blue vein, conforming with the structure in general of the northwest-southeast fissure, is a distinction.

Q. Well, I understood you to say a moment ago, Mr. Greene, that, apart from the places where you have an intersection of the Elm Orlu vein by the Jersey Blue vein, that the difference in structure or banding of the vein would not throw any light upon the question as to which one was older than the other?

A. No, I understood we were talking about the mineral contents of the vein at that time and I did not distinguish any very great difference between the minerals in the Elm Orlu vein and in the Jersey Blue.

Q. You recall, surely, that immediately after that, almost the next question was whether any difference in the structure or
355 banding of the minerals in the two veins would throw any light upon the question as to which was the older of the two and you said "no," did you not, "except at the point of intersection"?

A. I said that as to their age, but as to their identity, as to that it does, for me.

Q. I am speaking of the age now?

A. I don't know how you could maintain that except knowing them as types.

Q. For instance, let us assume they are both the fissures—these are fissure veins in the general sense I suppose, both of them?

A. There is a difference in the type of fissuring.

Q. What do you mean: difference in what respect?

A. One is distinctly a fault fissure, which has later been filled with vein materials.

Q. Yes, that is your conclusion, I understand that.

A. The other is particularly a zone of fissuring in which the country rock has been replaced almost entirely and the original fissures, for the most part obliterated.

Q. But that would not reflect upon the respective ages of the two?

A. I believe it would.

Q. In what way?

A. Because of the type. We have three recognized types here; we know the history of the camp—an east-west type, or a type of sheer zone fissuring; a northwest-southeast type, and that of
356 a simple fault fracture fissure.

Q. If the Elm Orlu being, as manifestly it is, the larger vein, through the fissuring there and better channel circulation for the solutions, deposited vastly greater ore bodies than in the Jersey Blue vein, you would expect, would you not, that there would be greater replacement of the country rock along the Elm Orlu fissure or zone of fissuring, whichever you choose to call it, than you would find in the weaker Jersey Blue vein?

A. Not only that, but the difference in age——

The Court: Answer his question and then you may explain.

A. Yes. And the element of time enters into that very materially. The period over which these veins have had an opportunity to be mineralized in the longer one naturally you would expect a greater mineralization.

Q. Well, one might be a very weak vein as compared with the larger vein and the period of mineralization might have extended over the same period, the mineralization of the two, yet if you had larger ore bodies in the one than in the other, you would expect a greater replacement of the country rock in the larger than in the weaker, wouldn't you?

A. That naturally follows.

Q. Suppose that you had the Elm Orlu fissure or zone of fissuring, whichever you choose to call it opened and thereafter because
357 there was a mineralization of the Elm Orlu vein, the Jersey Blue vein was opened or faulted and displaced the Elm Orlu fissure, that it was not until after that that mineralization of either took place, of course the channel fissure would not be classed as a vein, either the Elm Orlu zone of fissuring or the Jersey Blue fissure, when it was opened, simply channel fissures, they would not be called veins; you wouldn't designate them as veins until they had become mineralized, would you.

A. Well, if you can conceive of such a thing as that I don't suppose you would.

Q. Well, can't you conceive of a fissure being opened for a vein a considerable time before it is mineralized before an upflowing solution that may be due to a later disturbance, which started that flow?

A. Not in this connection.

Q. Not in what connection?

A. In connection with the general geology of the Butte camp.

Q. But elsewhere that might be so?

A. It might be; there is such a possibility.

Q. There is nothing very improbable about it, is there, that there may be two fissures or one fissure, I take it, open, and remain barren, due to the fact that there was no circulation of mineral bearing solutions through it for a very long period of time after it was opened?

A. No doubt.

358 Q. Thereafter, due to some dynamic force, solutions might be released, which should find their channel of circulation in that fissure and change what was a barren fissure into a vein; might that not be so?

A. That might be so.

Q. But it could not be so in Butte?

A. Well, it does not seem likely.

Q. Is there not in the Black Rock claim from the westerly end line thereof, to and across the easterly line of the claim at the surface, a vein standing almost vertical and almost directly over the long ore bodies shown upon your 1400 foot level of the Black Rock, traversing the claim on that level from end to end? Pull down the sheet if you please?

A. There is such a vein on the 1400.

Q. That is exhibit what?

A. Plaintiff's Exhibit 24.

Q. This shows an ore body from a point westerly of the west end line of the Black Rock claim, extending thence easterly and continuously to the easterly limit of the map, Exhibit 24?

A. Yes, sir.

Q. Now, at the surface and almost vertically over this ore body isn't there to be found the apex of a vein having a very slight dip to the south, standing almost vertical, which traverses the Black Rock claim from end to end?

A. No.

Q. You say that is not so?

359 A. No, sir.

The Court: Does that vein pass out there at the east end line?

Q. Does that map show the east end line?

A. It does; that is, the eastern limit of the map is the east end line of the Black Rock claim.

Q. But it shows a portion of the width of this ore body crossing the east end line of the Black Rock on that level?

A. Yes; the map shows about three feet. I have no doubt it crosses there.

Q. Well, a foot is as good as a mile sometimes; what is the course shown of that vein as shown upon this exhibit 24 at that level?

A. What vein?

Q. The vein shown; the red vein?

A. The general course is a little north of east.

Q. Almost due east and west; I don't care for the degrees.

A. Very closely.

Q. Pull down the 400 foot level of the Black Rock; what exhibit is that?

A. That is Plaintiff's Exhibit No. 11.

Q. What is the course of what you call the Jersey Blue vein on that level?

A. That is a little south of east.

Q. Almost due east and west?

A. Well, comparatively it is almost due east and west; somewhat different——

360 Q. Well, I don't care about that. Is there any level above that, westerly of the Black Rock fault, where the Jersey Blue is shown on any of your maps, or is that the uppermost level?

A. No; there is the Black Rock tunnel and the Dewey tunnel.

Q. Let us see that; pull that map down if you please.

Mr. Dickson: Our witnesses have been in the habit of calling this vein that Mr. Greene calls the Jersey Blue vein, the Black Rock vein, and what he called the Elm Orlu vein, or the Rainbow vein, we have been accustomed to call the Elm Orlu Black Rock vein, and I may sometimes use the wrong name.

Mr. Gray: We will understand.

Q. For what distance have you the Jersey Blue vein delineated on this exhibit, Exhibit 18, in an easterly and westerly direction?

A. Practically 800 feet.

Q. What is the course of it?

A. A little south of east in one portion.

Q. And from transit station 835 on this exhibit west to the most westerly delineation of the Jersey Blue vein on that exhibit, what is its course?

A. For half of this distance it is approximately east and west; for the other half it is considerably north of west.

Q. You mean from station 830?

A. From 830 westward.

361 Q. It is somewhat north of west there?

A. It is considerably north of west.

Q. I wish you would take up your maps, starting with the surface map, Exhibit 4, and going then without interruption from level to level to the deepest workings, and point out, with as much precision and accuracy as you can, just where you find or claim to have found the Rainbow lode parted by the Jersey Blue vein; start with the surface and take the levels down and do it with as much accuracy as you can; where do you find the so-called Rainbow lode faulted at the surface by the Jersey Blue vein?

A. It is not marked on the surface map by any workings absolutely at the surface. Immediately below the surface in the Black Rock tunnel it is found faulting the Rainbow lode and faulted by the Black Rock fault.

Q. Directing your attention to Exhibit 4, the surface map, you have a blue streak here marked Jersey Blue vein in a direction represented as connecting with the Rainbow lode, and just about 40 or 50 or 60 feet southerly from where it is represented as connecting with the Rainbow lode you have another blue streak running off southeasterly from the Rainbow lode. Were those two streaks put on the map to represent the Jersey Blue vein east and west of the Black Rock fault?

A. Yes, sir.

Q. What do you find on the surface there to justify that?

362 A. We do not find it on the surface to justify it, because of the fact that the surface is covered with buildings and the mine operations, timbers and other things, but immediately beneath the surface we find that condition.

Q. Well, there do not appear to be any buildings at the point where the westerly portion of the Jersey Blue vein comes in contact with the Rainbow vein; is there any dump there to cover it?

A. Yes, there is.

Q. Well, we will take the first level below the surface. You refer now to what exhibit?

A. Plaintiff's Exhibit No. 8.

Q. No. 8; that is the tunnel. Point out to the court where on this level you find the Rainbow lode faulted and displaced by the Jersey Blue vein as precisely as you can?

A. We do not find the actual physical displacement of the Rain-

bow by the Jersey Blue at this place, because of the fact that the Black Rock fault here has two strands, and what Rainbow we find is contained between those two strands.

Q. So that there is nothing there to show a faulting of the Rainbow lode by the Jersey Blue vein?

A. Only our experience in the other places in the mine, and the general laws of the geology of the camp.

Q. Well, I am not familiar with the camp or with its general laws. On this level, according to my understanding, there is nothing to show that the Rainbow lode has been faulted by the Jersey Blue vein?

363

A. No, there is not the actual physical evidence of it.

Q. You have represented here on this exhibit the Jersey Blue vein in blue coming in contact with the Rainbow lode about how many feet northerly of transit station 1072 is that?

A. It does not come in contact with the Rainbow lode.

Q. It is represented here as coming in contact with it?

A. No, sir.

Q. It just comes in contact with the Black Rock fault?

A. With the Black Rock fault at that point.

Q. What is the full width of it where it comes in contact with the Black Rock fault?

A. It is about four feet wide.

Q. Well, extending southeasterly from 25—that is not a station, is it?

A. No, that is drift No. 25.

Q. No. 25, there is a drift or working running southeasterly through or near station 1072, and then a broken line continuing southeasterly to a cross cut in which we find transit station 1058, and the Blue streak continues across that cross cut and onto the southeasterly. Is that intended to represent what you believe to be the broken segment or the other segment of the Jersey Blue vein?

364

A. Yes, sir.

Q. How thick is that there at the southeasterly extremity of the workings in which transit station 1072 is found?

A. It is about ten or twelve inches thick there.

Q. Does the Jersey Blue vein in your opinion fork in its course easterly, one strand of it bearing off to the northeast and the other to the southeast right in the vicinity of transit station 775?

A. I am not very sure about that.

Q. It is so represented upon this exhibit?

A. It is partly represented in that way.

Q. Isn't that intended to represent a forking of the Jersey Blue vein; both are colored in blue?

A. Well, at first, when this work was first done that seemed to be a forking; but work done later in a drift not numbered on this map, but which reaches No. 4 drift at about station 826, seems to show—well, it does show absolutely as far as this south branch is concerned, that it is not part of the Jersey Blue vein.

By Mr. Gray:

Q. State what you mean by the south branch?

A. A small vein which shows in an unnumbered drift, and passing through transit point 1114, and is shown on this map in blue with an apparent forking there, which is not the case. The line
365 of the wall of the Jersey Blue is shown continuously throughout this drift No. 4.

By Mr. Dickson:

Q. In which transit stations——

A. Which contains transit stations numbers 836 and 1052. This small vein is absolutely cut off.

Q. The one going out of it as station what?

A. 836. This small vein is cut off at station 836 and is not a part of the Jersey Blue.

Q. Cut off by what?

A. Cut off by the Jersey Blue vein.

Q. Perhaps I misunderstood you, Mr. Greene; if so you will correct me. I understood you to say on direct examination that the blue on these several maps of yours was intended to represent the Jersey Blue vein?

A. No, sir.

Q. You didn't say that?

A. No. Where it is Jersey Blue vein it is intended to represent the Jersey Blue vein, but in other places it represents other northwest fissures.

Q. Now, running in a somewhat northeasterly direction from Station 75 through to station 787 and beyond, and also from station 75 to station 786 and beyond, are those branches or portions of the Jersey Blue vein in your judgment?

A. I am not so sure; there is contradictory evidence there as to their identity.

Q. Have you reached any conclusion about it?

366 A. I believe that they are older than the Jersey Blue, myself.

Q. You believe they are older?

A. Yes, sir.

Q. This color was put on with your approval, if not under your direction?

A. Yes, sir.

Q. Wasn't that colored blue from station 75 to 786 and beyond, and from 75 to 787 and beyond—wasn't that colored under your direction or with your approval, because at the time that the geology was put on you regarded that as a part or branch of the Jersey Blue vein?

A. It has the appearance of being a branch of the Jersey Blue vein.

Q. No, that is not an answer to my question.

By the Court:

Q. You were asked with reference to why you had that colored blue, if it was not because you considered it a part of the Jersey Blue vein?

A. Yes, it apparently is a part of the Jersey Blue vein.

By Mr. Dickson:

Q. Do you know what has become of this northerly fork of the Jersey Blue vein; has that faulted in its course anywhere the Rainbow lode?

A. No, it never reaches the Rainbow lode.

Q. Have you traced it beyond that?

A. No.

367 Q. What are the general characteristics of the Jersey Blue vein in its mineralization or contents?

A. The general character of the Jersey Blue is a simple figure, usually having one very marked wall and often, and in fact usually two well marked walls.

Q. Any gouge?

A. Marked by a clay gouge, yes.

Q. Which is the better defined wall, the northerly or southerly wall?

A. In places, and in most places the northerly wall is the better defined.

Q. The vein is wider in places than in other places, as all veins are?

A. Considerably wider in places, yes.

Q. Who started the Clark drift shown on Exhibit 8?

A. It was started by the Black Rock people at the request of the Elm Orlu Company.

Q. Since December, 1913?

A. Yes.

Q. For what purpose did you request that that cross cut be driven; what were you in search of?

A. Well, for the purpose of finding the portion of the Jersey Blue vein then south of the Black Rock fault.

Q. Didn't you think you had it? As a matter of course it was to demonstrate a fault if you could find it?

A. It was for the purpose of finding a fault that we believed already demonstrated.

Q. Didn't you believe that you had found it in the work-

368 ings running southeasterly from near station 1072 to 1073?

A. That working had not been made; that has been made this year.

Q. I wish you would describe the first blue streak crossing the Clark tunnel as you go in the tunnel from its mouth, shown on Exhibit 8, its thickness, gouge, material contained in it, et cetera?

A. It is a fault vein with a gouge on both walls, and with quartz varying from six or eight inches up to eighteen inches, and with

more or less very highly altered and broken crushed granite between the two walls.

Q. Is the north wall of that vein well defined by a clay gouge?

A. The north wall is fairly well defined; the south wall is rather better defined.

Q. Is that so elsewhere, in other places than what you recognize clearly as the Jersey Blue vein; sometimes the south wall is better defined by the clay gouge than the north wall?

A. That is true of all northwest-southeast fissures.

Q. This vein that is shown in the Clark cross cut in the immediate vicinity of transit station 834, what is its thickness?

A. At the widest point it is about three feet.

Q. And where the Jersey Blue came in contact with the Black Rock fault at Station 1083, it was about the same thickness?

369 A. About 4; a difference of one foot.

Q. And then you continued the Clark cross cut southerly till you encountered what is represented here as another vein in blue?

A. Yes, sir.

Q. At transit station 1058?

A. Yes, but before this drift No. 1 was driven, this cross cut was in to station 810.

Q. Why did you go back and drift on that drift; in search of the Jersey Blue vein or a continuation of it?

A. It seemed possible that that might be the Jersey Blue vein.

Q. Were you inclined to think so?

A. I was a year and a half ago.

Q. When did you change your mind?

A. I changed my mind when we were able to follow the Jersey Blue vein down through drift No. 4 to its intersection with the Black Rock fault.

Q. Give us the dimensions and characteristics of this vein cut by the Clark cross cut near station 1058 as to gouge and width and vein material in it?

A. There are two gouges, one on either wall, with from 12 to 18 inches of quartz between them.

Q. What is the width?

A. The total width is about two feet.

Q. Did you become satisfied that you had there found the easterly continuation of the Jersey Blue vein, easterly of the Black Rock fault?

A. Yes, sir.

370 Q. Then the Clark cross cut was continued still further to the south?

A. Yes.

Q. Disclosing what?

A. A small quartz seam.

Q. Indicated in blue upon this map?

A. It is indicated in blue upon this map—oh, you mean the first one here?

Q. I mean the one you speak of.

A. I am speaking now of the small vein found in drift No. 2.
Q. In which station- 1000 and 1001 are found?
A. Yes.
Q. Having found at station 1058 what you were satisfied in your own mind was the eastern segment of the Jersey Blue vein, what was the purpose of continuing the Clark cross cut still further to the south?
A. It was continued still further to the south to pick up the Pyle strand of the Rainbow lode.
Q. Did you pick it up?
A. I don't know.
Q. Did you pick it up in that cross cut or any of the workings connected with that cross cut?
A. I don't know.
Q. If it is there you could not recognize or identify it?
A. If it is there we could not identify it.

371 Q. Take the next level and point as accurately as you can to the point where you find the Rainbow lode faulted by the Jersey Blue vein?

A. This is——
Q. Is this the first level sheet? You have but the one; we have just been referring to that from which the tunnels are shown, the Clark tunnel and the others?
A. No.
Q. I want the first one below the tunnel. That is plaintiff's exhibit 11 you now have?
A. Plaintiff's exhibit 11, for the 400 foot and 450 foot levels of the Black Rock.
Q. The last exhibit we had was 8; where are 9 and 10? Look on 9.

Mr. Gray: I understood you wanted the next level on which this is shown.
Mr. Dickson: That is it, but I want to look at it myself and see.
Mr. Gray: Pardon me.

Mr. Dickson:

Q. The Jersey Blue vein designated by you is not shown on exhibit 10?
A. No, sir.
Q. Bring down exhibit 11. The Jersey Blue is shown upon this exhibit 11—is the Jersey Blue shown on 10 at all?
A. No, sir. We just had 10.
Q. On exhibit 11 is the Jersey Blue vein shown?
A. Yes.
Q. Point out which of these levels, if at all, you find the Rainbow lode faulted by the Jersey Blue vein?

372 A. It is faulted near the end of drift 456, on the 450 foot level?

Q. What is shown in blue on the 456 drift is intended to represent a fault segment of the Jersey Blue vein?

A. It is the segment of the Jersey Blue vein west of the fault.
Q. What is its thickness?
A. It is from twelve to eighteen inches thick.
Q. Anything else descriptive of it that you could add?
A. It is accompanied by the usual fault gouge.
Q. What is in it in the way of minerals or is it simply a barren fissure?
A. No, it is not a barren fissure. There is a little quartz, along six or eight inches up to twelve inches.
Q. Broken or continuous?
A. The quartz?
Q. Yes.
A. I don't recall whether it is broken or continuous. I should say it is continuous, but the quartz may be shattered.
Q. Roughly speaking, what is the distance between the westerly termination of the Blue vein found at drift 456 and the easterly termination of the Jersey Blue vein in drift 422; roughly speaking?
A. We find the Rainbow lode and the Black Rock fault between the two.
Q. What is the distance, I say?
373 A. The distance about 200 feet.
Q. And what is the thickness of the Jersey Blue vein at its easterly extremity, at drift 422?
A. I don't know; I have never been in the eastern extremity.
Q. You have never been in there?
A. No, sir.
Q. How far easterly have you been along that drift 422?
A. I have never been in drift 422 at all. I have been in crosscut 406.
Q. Were you in crosscut 406?
A. Yes, sir.
Q. Does that cross the Jersey Blue vein?
A. Yes, sir.
Q. What is the thickness there of the Jersey Blue vein?
A. On the east side of the crosscut?
Q. Both east and west sides; what is the thickness of the entire vein there?
A. Oh, about four feet, a few inches of gouge and the rest of it all country granite and very little quartz in it.
Q. Have you stated everything, every observation that you were able to make from which you correlated the vein represented in blue at drift 456 as the Jersey Blue vein, represented in drift 422?

Mr. Gray: You mean on that level, Judge?
Mr. Dickson: Yes, on that level.

374 A. Why, there are no other veins that correlate in there, that you could correlate with the Jersey Blue.
Q. My question is, Mr. Greene, and I would like to have a direct answer and then I have no objection to your making any explanation you want to make—have you stated to the court all the facts ob-

servable by you from which you reached the conclusion that the blue vein shown on this exhibit in drift 456 ought to be correlated with the Jersey Blue vein found in drift 422?

A. No.

Q. What other observations did you make; what other facts did you observe?

A. The general position of the vein and the dip vertically, and the fact that crosscut 451 contains no other northwest-southeast vein of the same type.

Q. Anything else?

Q. And then if these are projected on their own direction from the main strand to the Black Rock fault, they will closely correspond in position.

Q. Anything else?

A. That is all I can think of at present.

Q. What is its dip, angle of dip and direction of dip of the blue vein found in drift 456?

A. It is slightly to the south; somewhat to the south.

Q. Did you take the angle of the dip?

A. I took the angle of the dip in that drift, yes.

Q. Have you a note of it?

375 A. Yes.

Q. Where you can refer to it quickly?

A. I can give it to you; 76 degrees south.

Q. And what is the dip in the Jersey Blue vein in the only part of it you were ever in that is crosscut on the 406 crosscut?

A. It is practically vertical.

Q. Are you able to inform the court to what extent the Rainbow lode has been faulted by the Jersey Blue vein at that level?

A. It is not exactly measurable at that level. The southern strand of the Black Rock fault cuts off the Jersey Blue before it could have passed through the whole of the Rainbow lode.

Q. Go to the next level?

A. Twelve does not show any cutoff of the Rainbow by the Jersey Blue.

Q. Take 13—pull down 11 again. This long crosscut on exhibit 11, crosscut 451, is it?

A. Yes, sir.

Q. Does that traverse the same territory in a northerly and southerly direction as is traversed by the Clark tunnel; does it extend as far to the north and as far to the south as the Clark tunnel?

A. It extends as far to the south and much farther to the north.

Q. In the Clark tunnel you had two blue veins, one that you first thought, a short distance in from the mouth of the tunnel,

376 sixty feet or so, was the Jersey Blue vein?

A. Yes, sir.

Q. You afterwards concluded you were mistaken about it?

A. Yes, sir.

Q. Then what has become of it at this level, the 400 foot level; it is not disclosed on this level at all?

A. Not accessible.

Q. Isn't the crosscut accessible from the end of it?

A. The crosscut is, yes.

Q. Did you find that vein, the first vein that you had in the Clark tunnel on this long crosscut?

A. I am not sure that we did or did not. I haven't searched for it very closely.

Q. I expect you are a pretty careful observer?

A. As a rule.

Q. If you had discovered anything of that kind don't you think you would have it here exhibited on this exhibit 11?

A. Likely. I haven't put all the details on there. It might be in this appellation "small vein," but it does not show in that crosscut in the way that you can identify it.

Q. Have you any recollection of having observed it in that cross cut?

A. No, I don't recall exactly.

Q. Now, take 13. Point out to the court so much as you
377 can where you found the Rainbow lode on the level faulted by the Elm Orlu vein?

A. It is faulted in drift 810.

Q. Anywhere else?

A. No.

Q. The main branch, at that station, of the Elm Orlu vein extending westward from the 809 crosscut along drift 814 and 818, does that vein come to a connection with the Rainbow lode?

A. No, sir.

Q. It stops against the Black Rock fault?

A. It comes to a stop when the Rainbow lode is very badly faulted and dragged, possibly along both the Black Rock fault and the Jersey Blue vein.

Q. Through stations 79, 99 and 100 of this exhibit the Jersey Blue vein is represented as being in contact practically all the distance with the Rainbow lode, is it not?

A. It is so represented.

Q. It is accurately represented?

A. Yes, if you will understand what the representation means. The 808 drift follows along the Jersey Blue and the identity of the Jersey Blue is maintained as far as it exists in that drift, but of the Rainbow lode there is a fault, a very badly broken portion, between the Jersey Blue and the Black Rock fault.

Q. But the result is we find no evidence there, as I understand it, of the Rainbow lode having been faulted by that segment of the Jersey Blue?

378 A. You do find evidence.

Q. In the broken condition of the country rock?

A. Yes, and the dragging around of the ore and the curling of it against the Jersey Blue.

Q. It would appear from this representation that the Jersey Blue vein, that segment of it which you say lays west of the Black Rock

fault and from stations 97 on to 101 and thence easterly, has been deflected northerly in its course, bent?

A. Bent.

Q. Bent by the Rainbow or what bent it?

A. It might have been bent originally partly by the Rainbow and later more by the Black Rock fault.

Q. But the Black Rock fault does not come within a considerable number of feet of it according to this picture?

A. It faults it at station 104.

Q. Yes, but from thence west to station 97 the Black Rock fault lays some considerable distance to the south?

A. No, a very short distance.

Q. About ten feet?

A. That is a very short distance over two or three miles.

Q. But in all events, instead of having the Jersey Blue vein cutting into and displacing the Rainbow fault at station 97 or anywhere easterly therefrom to station 104, the Jersey Blue itself does deflect in its course, deflects to the north?

379 A. That is quite natural.

Q. Well, that is the fact, isn't it?

A. It is the fact. I do not know what existed before the Black Rock fault went through there. That is I cannot restore the exact position of the Jersey Blue.

Q. If you have a fault fissure, we will say, crossing in any direction, north and south, which at various levels displaced faults and displaced another fissure or another vein, the direction of the displacement of the faulted fissure would of course be in the same direction on every level?

A. Not at all.

Q. I do not mean to the same extent, but it would be in the same direction, would it not?

A. Not necessarily.

Q. Would you expect, for instance, if you had a north and south fault fissure, it faulting an east and west vein at various levels from the surface to the 1,000 foot level, that on the 1,000 foot level, for instance, we might have the faulted vein on the easterly side of the fault fissure thrown to the south and on the level above we might have the faulted vein on the same side of the fault fissure thrown to the north?

A. Yes.

Q. And that would be accounted for how?

A. It would be accounted for by the fact that veins are seldom ideal planes. They rarely conform to one plane surface and

380 they wave and undulate in their course.

Q. But this Jersey Blue fissure from the uppermost workings that you have observed to the deepest workings, stands almost vertical, does it not?

A. If you connect the two of them—a line connecting these two points would be vertical. The dip of the Jersey Blue is various to the south and to the north, and it presents a very irregular and greatly arcing plane.

Q. And sufficient variation, in your judgment, to account for the fact that on one level the Jersey Blue on the east side of the Black Rock fault might be thrown to the south and on another level on the same side the Jersey Blue would be thrown to the north?

A. Yes, sir, under the conditions we have, acute crossing.

Q. I mean the conditions that you have to deal with in this mine and in this vein?

A. These are the conditions which prevail.

Q. As you travel easterly along the Jersey Blue fissure to where you find it faulting the Rainbow lode on the south side of the Jersey Blue faulting fissure, in what direction has it thrown the Rainbow lode; to the east or to the west or to the southeast or to the northwest or how?

A. Coming east.

Q. Coming east, following the Jersey Blue vein which has faulted the Rainbow on the south side of that faulting fissure at various levels, in what direction has the faulting fissure thrown the Rainbow lode?

381

A. I don't think it has thrown it very perceptibly in any direction.

Q. What is the general direction in which it has thrown it?

A. I don't know.

Q. Why; haven't you observed?

A. No, there are not enough absolute points to measure the general directions.

Q. So it is the fact, is it, Mr. Greene, that taking all of the levels together, that is to say all of the levels on which you have found what you believe to be a faulting of the Rainbow lode by the Jersey Blue vein, that you are able to say in what direction the Rainbow lode has by that faulting vein been thrown?

A. That depends upon the general direction—in answering your question in addition to the downward displacement or dislocation that would show in the plans to be variously east and west along that fissure, depending on the angle of dip.

Q. You say "in addition to the downward throw caused by the Jersey Blue fault vein." Has there been a lateral displacement also of the Rainbow lode?

A. That naturally would follow.

Q. Has there been?

A. Yes. I can't measure it, but there has been a lateral displacement.

382

Q. Can you tell in what direction that lateral displacement has been?

A. It has been from the east to the west where observed.

Q. In every instance or has it sometimes been thrown from west to east—taking now the south side of the fault fissure, Jersey Blue fault vein, has it in some instances following along that south side of this fault vein—do you find in some places where the Rainbow has been faulted by the Jersey Blue and by the fault or dislocation thrown easterly and at other places where the same side of the fault has been thrown westerly?

A. No. I don't know of any such place.

Q. It has always been easterly then, has it?
A. As far as I have been able to measure it accurately.
Q. Where you have been able to measure accurately?
A. In the last level we saw, 450 and on this level and on the 800 of the Black Rock.
Q. What is the extent of the displacement on the 800 we have before us?
A. It is about nine or ten feet.
Q. Indicated at where we have station 108?
A. Yes, sir.
Q. Go to the next one now.

The Court: What special feature is expected to be illus-
383 trated by whether this Jersey Blue faults the Rainbow lode?

Mr. Dickson: We deny it, and we expect to show by our own testimony that it is a physical impossibility that it could have faulted it in the way claimed by the other side.

The Court: What depends upon the proposition whether it does or does not?

Mr. Dickson: Much stress will be laid by our friends upon the other side upon the contention that the Elm Orlu is a later vein than the—that the Jersey Blue is a later vein than the Elm Orlu. I am not capable of going now into a complete explanation of it, but I know I am justified in saying—my friends will correct me if I am not justified in saying—that they will attach much importance to their contention that the Jersey Blue is later than the Rainbow and faults it. I don't want to consume time unnecessarily, but I want to get at the facts.

The Court: I think both of you might take the court sufficiently into your confidences to let us know what depends upon all of this testimony at the start.

Mr. Dickson: I have no objection to saying what our testimony is. I cannot, of course, enlighten the court fully as to what the contention on the other side is, but I do understand, and the silence of my friends confirms what I say, that they attach much importance and will in their argument of the case, to the contention or the fact, as claimed by them, that the Jersey Blue is a later vein than the
384 Rainbow and faults it. Our contention will be that the Black Rock-Elm Orlu vein as we call it, crosses the western side line of the Elm Orlu, passes out of the common boundary line between that claim and the Black Rock and extends thence in a northeasterly direction; that the Jersey Blue vein was formed at the same time as the Elm Orlu vein, that its course is easterly and westerly substantially, that it forms practically a junction with the Elm Orlu vein, without faulting it or the Rainbow vein, and thence goes on its course northeast over the side line and the other fork over the easterly end line of the Black Rock claim. That will be our contention.

The Court: Surely we are not sitting here simply to determine a geological problem. There must be some legal connection to follow.

Mr. Dickson: Except so far as the geological problem might have a bearing upon the law, no. Now, I am not violating any confi-

dences, I do not think, I have been assured by some of the gentlemen on the other side that the fact that the Jersey Blue vein is an older vein and faults the Rainbow lode will be conclusive against our recovery in this case; and the silence of my friends again confirms what I say. Just how they are going to argue that out, I do not know, but I want to disprove the fact if I can.

Of course there is another question of law involved that maybe should have been stated more clearly to the court than it has
385 been and that is the question of priority of title. We claim that the Black Rock claim is prior to the Elm Orlu. They claim that it is junior. They claim as I understand—I might be mistaken about it—that the Jersey Blue vein and Elm Orlu unite in their downward course. If they do, the elder claim would have the title.

Mr. Gray: You say you claim that.

Mr. Dickson: I say I don't know but that you claim that.

Mr. Gray: We claim that they cross.

Mr. Kremer: But in event they should unite, your position will be as indicated by Judge Dickson.

Mr. Dickson: If their contention is that they intersect in their downward course and cross each other, then the older claim would take all within the interlocking area of the two. I assure your honor that I think, and our experts advise me, that this is important. I don't want to consume time.

The Court: It is not that. I would like to be enlightened as to what we are trying. If it is simply to determine a geological problem that has no legal connection here we might let the experts go out and fight it out among themselves. I would like to know what the legal consequences are that follow; what is claimed will follow.

Mr. Gray: I was going to say that the law with reference to veins that unite upon their dip is different from the law in regard to cross veins.

386 The Court: You are attempting to show a priority and a crossing, why; what for?

Mr. Gray: For the reason that we believe that the rights to these ore bodies are to be determined solely by the overlap of the apex of the Rainbow lode; that the ore bodies are within that vein and that the Jersey Blue vein has nothing to do with the ore bodies which are found within the Rainbow lode; that it is simply one of those blue veins, faults that has coursed northwest and southeast, cutting entirely through it, and extended on its own course southeasterly beyond it; and that no rights to the ore bodies within the Rainbow lode are to be granted because of the ownership of the apex of this northwest fault.

The Court: You are claiming to have the apex of the Rainbow lode and the ore bodies by virtue of it.

Mr. Gray: Yes, sir.

The Court: Do they claim anything by virtue of the Jersey Blue vein?

Mr. Gray: I imagine they do.

Mr. Dickson: We certainly do.

The Court: Just state it briefly to the plaintiff so we will know what we are trying, so the court will understand the issues and the importance of this evidence as we go along.

Mr. Dickson: In addition to what I have said, we claim that the Jersey Blue vein, on account of being thrown to the southeast by a fault as claimed by the other side, it extends clear across the
387 end line of our claim.

The Court: You are claiming the apex right based on that?

Mr. Dickson: In part. We claim we have the senior location and we have also the apex of that vein.

The Court: The court is beginning to have an inkling of the claims. Proceed.

Mr. Dickson:

Q. Point out where, if at all, you find the Rainbow lode faulted by the Jersey Blue vein?

A. In drift 702 near station 817.

Q. I may be mistaken, but it would appear from this map that on that level, if there had been such faulting, the lateral displacement of the Rainbow must be westerly instead of easterly.

A. It is westerly. It is from east to west. As I stated in the previous exhibit, if you approach it from the east, it is from the east to the west.

Q. Go to the next one?

A. Exhibit 15.

Q. Point out there where you have the Rainbow lode faulting, the direction of the fault, the extent of the displacement by the Jersey Blue vein?

A. It is shown on the map, is delineated on the map, but it is the result of projection and is not upon the physical workings at the point.

Q. At the point where you have conjectured, and so represented upon this exhibit, the Rainbow lode as having been faulted
388 by the Jersey Blue vein, you don't know whether that is so or not?

A. That is so, from our general experience.

Q. We have now Exhibit 16, 1000 Elm Orlu and 900 Black Rock. Point out there where you have the Rainbow lode, in your judgment, displaced by the Jersey Blue vein, the extent and direction of the displacement and the evidences of it; all evidences of it.

A. On this level the Jersey Blue vein is shown crossing at a raise in 923 drift.

Q. Where I now point?

A. Yes, sir. There the Rainbow lode is cut off as it approaches the Jersey Blue from the east.

Q. In what direction was it thrown there, easterly or westerly?

A. I don't know. The workings don't disclose the throw.

Q. What is the greatest extent of displacement of the Rainbow lode, in your judgment, that you have ever found as a result of the faulting by the Jersey Blue vein; how many feet, maximum?

A. I don't know how many feet maximum.

Q. If this be a part of the Jersey Blue vein, this blue streak which is cut by crosscut 923, and faulted by the Rainbow lode on this level, it must have been a very considerable displacement of the Rainbow lode would have been found here in drift 902, wouldn't it—what is the width of the Rainbow lode there where you say it is faulted by the Jersey Blue vein?

389 A. It is about thirty-five feet.

Q. To what extent must the Rainbow lode have been displaced to prevent its reappearance in drift 902?

A. I don't know.

Q. Very considerable apparently?

A. Quite considerable apparently.

Q. How much at a minimum?

A. At a minimum about 30 feet.

Q. Have you anything else to show any such extent of displacement of the Rainbow lode by the Jersey Blue as that would be?

A. I cannot measure it.

Q. Answer the question?

A. No. I cannot measure it.

Q. Take the next map, Plaintiff's Exhibit 17. You don't claim that Exhibit 17 shows the Rainbow to have been faulted by the Jersey Blue?

A. No, sir.

Q. Take the next?

A. We have now Exhibit 18, the 1000 foot level of the Black Rock.

Q. Well, where on this level do you claim that the Rainbow lode has been faulted and displaced by the Jersey Blue vein?

A. It is displaced in crosscut No. 1001 near station 146.

Q. What has been the extent of the displacement there, have you any idea?

A. I don't know.

390 Q. In which direction has the Rainbow lode been thrown at that level by the Jersey Blue vein?

A. It must have been thrown slightly to the west.

Q. Well, it may have been to the east?

A. Apparently not.

Q. This piece of the vein I take it to be, because it is marked in red, and which we find immediately below the figures 1014, I understand that is the southerly strand of the Rainbow lode?

A. Yes.

Q. What you speak of as the Pyle strand?

A. Yes.

Q. Now, if the Rainbow lode is cut off by the Jersey Blue fault in that part where we find stations 497, 682 and 146 and thence on easterly to the end of what is shown in blue there, what must there be the extent and position and direction of the displacement of the Rainbow lode so that it would not appear in any of these workings easterly or westerly?

A. It might be seven or eight or ten feet.

Q. Where would you expect to pick it up again in No. 1006 crosscut?

A. I think in 1006 crosscut—I am sure in that crosscut if it were continued it would pick up the Rainbow lode.

Q. It does not disclose it as far as it has been driven?

A. No, sir, and no workings there in that particular working have shown it.

391 Q. Give us the description of that crosscut, the length of it, et cetera?

A. It is about 35 feet.

Q. This is Exhibit 19, the 1200 Elm Orlu and the 1000 of the Black Rock. Do you claim that the Rainbow lode on that level has been faulted at all by the Jersey Blue?

A. Yes, sir.

Q. Where?

A. Near station 890 I think it is, or possibly it is 899; it is a little obscure; but to identify it, it is at the northern end of crosscut 1104.

Q. Is this broken linè which I now indicate intended to be blue?

A. Yes, it is blue.

Q. Is that intended to represent the Jersey Blue?

A. Yes.

Q. How thick is it where cut by that crosscut or this crosscut or both?

A. The gouge is all that is represented here.

Q. How thick is the vein, the Jersey Blue vein there as indicated—is there anything but gouge in it?

A. Well, I cannot tell what was in it. That had been lagged before I saw it, but I can see the gouge going off to the east in 1103 drift.

Q. Couldn't you see the roof of the drift?

A. No, it is stoped as far west as the Jersey Blue vein, and the stopes end at the Jersey Blue vein.

392 By the Court:

Q. Do you mean the Jersey Blue vein or the Black Rock fault?

A. No, the stopes end at the Jersey Blue vein; they do not come in contact here with the Black Rock fault.

By Mr. Dickson:

Q. The Black Rock fault runs to the north?

A. Yes.

Q. The stopes follow southwesterly?

A. The plane of it terminates the east-west fork, and what we believe to be part of the Jersey Blue vein is marked there. How wide the Jersey Blue vein was at that point cannot be ascertained from these workings, because the ore is all stoped out; the ground is all stoped out north of the Jersey Blue.

Q. Was there ore in the Jersey Blue before that?

A. Yes, sir.

Q. And you stoped it?

A. Yes.

Q. To what width has it been stoped?

A. In the stopes immediately below drift 1103 the portion of the Jersey Blue is stoped—that is, all of the Jersey Blue was taken along with the Rainbow lode, and that portion was from three to four feet wide.

Q. Where cut by crosscut 1104 can you tell what the width was there?

A. It was not cut by crosscut 1104. It exists——

Q. It looks like it on this map.

A. Well, that is a parallel seam, and it may be that it is
393 part of the Jersey Blue, or merely a sympathetic fissuring.

Q. Well, you have two seams there at the northerly end of that crosscut; are they intended, both of them, to represent the Jersey Blue vein?

A. The southerly one is a minor seam, and is probably a sympathetic crack along there.

Q. The other is intended to represent the Jersey Blue?

A. Yes.

Q. Can't you tell from that what the width of the Jersey Blue there was?

A. The width of the Jersey Blue vein proper, as I said before, is not disclosed in those workings, but in the stopes immediately below it shows to be three or four feet wide.

Q. Well, westerly or southwesterly from station 899, do you find the Rainbow lode?

A. Immediately west of station 899.

Q. That being so, there could have been practically no displacement of the Rainbow lode by the Jersey Blue fault at that place?

A. Oh, yes; the Rainbow lode is very wide there.

Q. Well, go ahead. At this point, where it is cut off at the northerly end of crosscut 1104 it is not very wide; how wide is it, measured at right angles, not along that drift?

A. The Rainbow——

394 Q. No, no, here at the westerly end, near station 899, how thick is the Rainbow vein there?

A. I cannot measure it there, because that is only a very small point of the Rainbow.

Q. Well, at that point how thick is it?

A. At that point there is 10 feet of the Rainbow vein showing.

Q. What is the distance from where you have what you believe to be the Jersey Blue vein easterly of the Black Rock to where you have it westerly of the Black Rock?

A. About 330 feet.

Q. And how wide is the Jersey Blue vein, that vein westerly of the Black Rock fault?

A. 14 feet.

Q. Is this to which I now point in which we find stations 1102, 1065 and 1016—is that what you call the Pyle strand?

A. Yes, sir.

Q. Has that been faulted by the Jersey Blue fault?

A. Yes, sir.
Q. Where?
A. At the point Y.
Q. What are the evidences of faulting there; what is the direction and the amount of displacement?
A. The evidence of faulting is, first, the bending of the south wall of the Pyle strand to the north, and finally the final breaking
395 of that wall and the displacement of some three or four feet, and again a bending to the east.
Q. Both shown—pull down No. 16 again, if you please.
A. I have the levels on the index, and not the Exhibit number. This is 19.
Q. Well, I want the one immediately before the one we have just been referring to. Referring again to Exhibit 16, this is the place where, as I understand you, you said that the displacement of the Rainbow vein by the Jersey Blue fault must have been 35 feet or such a matter?
A. That the minimum might be 35 feet.
Q. On the map the Jersey Blue fault is represented as crossing the Pyle branch of the vein also?
A. Yes.
Q. Has it faulted that?
A. Yes.
Q. Where?
A. In stope No. 933.
Q. And what has been the extent of the displacement there?
A. It is very little.
Q. How much in minimum or maximum, either way?
A. Oh, three or four feet, possibly.
Q. And possibly not more than a foot, isn't that true?
396 A. Why, it might be considerably more than three or four feet.
Q. And might be considerably less according to this picture, surely?
A. Well, that only represents the tracery at that particular plane.
Q. Has there been any such displacement by the Jersey Blue vein of the Pyle branch as the main branch, 35 feet?
A. Probably not, but the two portions of the two different veins, in their displacement—one section is brought down, and the wider or narrower section may exist on this plane at the point of intersection.
Q. All right, go to the next one?
A. No. 19 was the last we had.
Q. This is No. 20. You also claim that the Rainbow vein has been faulted by the Jersey Blue on this level?
A. It does not show on this plane.
Q. All right, take the next one then?
A. No. 21.
Q. Do you have the Rainbow lode faulted by the Jersey Blue on this Exhibit 21?
A. Yes, sir.

Q. Point out where, and the extent of the displacement?

A. The Rainbow lode is displaced in crosscut 1201 and in the stopes above drift 1203 and in drift 1202 and near crosscut 1206.

397 Q. What is the evidence of the displacement that anybody going there can see that it had been cut off or displaced by the Jersey Blue or any other fault?

A. The termination or the end as far as that particular block is concerned of the ore, coming in its westerly direction up to and against the northwest-southeast fault plane.

Q. If it had been thrown either easterly or westerly or northerly or southerly, it should have been encountered—the other section that was cut off—either in crosscut 1201 or the workings northerly from station 60, in the 1210 lateral — the 1209 lateral, and the workings running out to the Black Rock shaft, or in the workings running southerly from crosscut 232 — station- 232 and 235 and so on to the south, should it not?

A. Not necessarily.

Q. Unless there had been a very considerable displacement; what has become of the faulted segment if it is not disclosed in any of these workings?

A. Well, the faulted segment, as I said before, is of a different shape entirely, probably, from that which exists on this plane, and I don't know exactly what the boundaries or the displacement is here.

Q. In what direction and to what extent must it have been thrown or displaced if it be not found in crosscut 1201 or 1210 lateral or 1209 lateral or the workings running out from station 60 to the Black Rock shaft or in 1222 crosscut or in station 232 or 235—what direc-

398 tion must it have been thrown not to appear in those workings?

A. I don't know what direction.

Q. Do you know how far approximately or what direction it must have been thrown not to appear in these workings?

A. I don't know; I couldn't say.

Q. Take the next map, Exhibit No. 22. This is one of the levels, if I am not mistaken, as to which you testified on direct that the Jersey Blue vein traverses the Rainbow lode, lying between the walls thereof?

A. Yes.

Q. And has faulted the Rainbow lode on that level?

A. I think so.

Q. Where?

A. In drift 1304 it has been faulted near station 263.

Q. What are the evidences of faulting there or displacement of the Rainbow lode; is there any displacement of the Rainbow lode represented there as having been due to the Jersey Blue fault?

A. Yes, sir.

Q. What is the representation of that?

A. The lode on the north side of Station 263 and the lode on the south side of the drift betwen station- 264 and 265.

Q. Where, between the Jersey Blue vein as represented on
399 this level and the lode that you have referred to as being a portion of the Rainbow lode near station 263, I see you have stoping represented there that is uncolored; what does that mean?

A. I don't think stoping is represented there.

Q. Then what are these squares?

A. That is a raise.

Q. I don't mean the raise, but these sets?

A. Those are sill sets of a drift, not necessarily of a stope.

Q. Two sets wide, don't that represent the sill floor of a stope?

A. Not necessarily.

Q. Don't you think it does there in that particular place?

A. No, I don't.

Q. What do you think those two sets wide there that 10 or 12 feet in length there, what do you think that represents?

A. They were put there——

Q. What were they put there for?

A. They were put there in order to start a raise from that drift.

Q. Isn't it a fact that the Rainbow ore there comes right down without any interruption to the Jersey Blue vein?

A. It does come down to the Jersey Blue vein as you go west.

Q. Showing no cut off at all?

A. Oh, yes, there is a cut off.

400 Q. Where?

A. Near station 263 on the first floor. This drift was timbered and lagged when I first saw it. Later this was taken out here.

Q. What was taken out?

A. What we call the sill floor stope, and I found no ore in it.

Q. No, but what I was pointing to were the sill floors where they were of such shape——

A. Well, I want to correct the impression that I may have given or you may have given as to that being a sill floor stope. Originally there was no such width as shown by the outlines on this map near station 263; there was a raise, however, and the wall showed very clean and very clear going up along the place where drift 1304 widened for the purpose, apparently, it seemed then, of having a raise outside of the drift itself.

Q. Mr. Greene, how far westerly of that raise do you have square sets there two sets wide; 50 or 60 feet, isn't it?

A. Yes.

Q. And we have the square sets in the blue color, and then going right on northerly with square sets that are uncolored, and connecting with the square sets that are colored red?

A. Yes.

Q. For a distance in width of how much, right through
401 263—doesn't that represent stoping in your judgment?

A. It is under a stope.

Q. Doesn't that represent the sill floor of a stope to anybody?

A. Well, from what I see there I don't think it does at the east end, but going further west it certainly does.

Q. Now, is this one of the levels where on direct examination you

said that you had evidence, from the structure of the Jersey Blue vein, where it transversed the Elm Orlu vein, that it was later than the Elm Orlu or Rainbow vein?

A. Yes, sir.

Q. Just what is the difference in the structure of the ore between stations 428 and 264 that enables you to say that a part of the ore is in the Jersey Blue vein and a part of it in the Rainbow vein?

A. The fact that there is a continuous northwest-scutheast gouge through there, and along that gouge more or less continuous quartz and zinc ore, which in every case is parallel to the gouge. The banding of the quartz and zinc ore is parallel to the gouge.

Q. The banding of the quartz in the Jersey Blue vein?

A. Is parallel to this northwest gouge.

Q. But the banding of the quartz in the Rainbow is in what direction?

402 A. The banding of the quartz in the Jersey Blue is parallel in plan to the gouge, and also parallel in section; that is, both vertically and horizontally this banding closely conforms to the Jersey Blue gouge.

Q. Now, in the Rainbow lode——

A. Now, in the Rainbow lode there is no gouge parallel to the banding visible through this point till you get out in the stope on the first floor toward the east near the raise west of station 264. There the banding gives evidence of the structure; there is a line of zinc seams which is more nearly east and west, and dip to the north.

Q. Are there zinc seams in both the Rainbow and the Jersey Blue there?

A. Yes, at different angles.

Q. The same kind of vein filling?

A. Absolutely.

Q. I wish you would point to one or two places where, if the lagging is removed and his honor will consent to go to the places, he can see the difference in the structure of the ore in the Jersey Blue and in the Rainbow vein. Point out definitely some place where we can have the timber removed if we wish?

A. I believe you will find it any place along the back of those stopes. The floor that I saw it on has now been removed entirely.

Q. You will find it anywhere there in the roof?

A. I think so.

Q. Where the Jersey Blue has intersected the Rainbow
403 near station 428, did it fault the hanging wall of the Rainbow lode there?

A. I believe so.

Q. As shown upon this map?

A. We do not get the hanging wall within the limits of that drift, west of its face; we cannot see it; there is no hanging wall represented there.

Q. It is represented extending as far in a northwesterly direction, that drift is, as the northwesterly termination of the Rainbow lode at that point?

A. Yes, but we are satisfied that it goes on there a ways.

Q. But it is represented here as reaching the northwesterly terminus of the Rainbow lode?

A. Yes.

Q. And it does not fault it there, does it?

A. Yes.

Q. Well, it is not shown here, is it?

A. Why, the fault exists there.

Q. Is it shown on this picture?

A. No; the termination of the north wall of the Rainbow lode is broken there. You can see it under ground.

Q. Take the next one, Exhibit 23. This is another level—another instance where you have, according to your observation and conclusion, the Jersey Blue traversing for a distance the Rainbow lode?

A. Yes.

Q. And lying between the walls of the latter?

404 A. Yes.

Q. And where again you say you have the different structures shown?

A. Very, very clearly defined.

Q. Throughout the whole extent in the roof?

A. Yes, sir; that is visible now. This is a crosscut along there; also we find the same condition, or the same difference in drift No. 1504.

Q. Whereabouts is that drift No. 1504?

A. At and near the raise which is shown here.

Q. Near what station?

A. Near station 8. And in the raise itself we find the Rainbow lode faulted by the Jersey Blue.

Q. Faulted?

A. We find it cut off and faulted; it must be faulted.

Q. While we have this here I will ask you another question with reference to the ore found in crosscut No. 1513, you said that was probably part of the Rainbow lode?

A. I think it probably is.

Q. Why?

A. Because those ore bodies lie immediately under the large stope above, which is on the Rainbow lode, or is part of the Rainbow mineralization.

Q. Do you think it is all one vein shown in this crosscut, from the most southerly red to the most northerly red?

405 A. No, not all one vein as a simple vein, but as a stock work of many interlacing fissures, it is part of the same thing that exists above; I mean this part marked in red.

Q. Take the next map Exhibit 24, the 1400 Black Rock. Where do you claim the Rainbow lode has been faulted by the Jersey Blue there?

A. The portion of the Rainbow lode has been faulted in this stope along drift 1404.

Q. Whereabouts?

A. It is visible—the visible evidence of that faulting now is at station 247, and in the face of the drift at the west end.

Q. Referring to station 247, in what direction and to what extent must the Rainbow lode have been displaced not to have been encountered in crosscuts 1406 and 1416?

A. 1406 is not accessible.

Q. Is 1416?

A. Yes, 1416 is accessible.

Q. In what direction must the Rainbow lode have been faulted by the Jersey Blue vein not to appear in crosscut 1416?

A. Why, it could be anywhere from the point where the Jersey Blue crosses the crosscut 1416, westerly along the Jersey Blue vein.

Q. What must have been the minimum of displacement to account for the fact that it is not found anywhere in crosscut 1416?

A. The minimum displacement?

406 Q. The minimum displacement to throw it out where it would not be caught by that?

A. I don't see how the minimum displacement would account for the fact that we don't find it in 1416.

Q. Well, the maximum displacement then?

A. Well, the maximum displacement would be in the neighborhood of about 60 feet.

Thereupon an adjournment was taken until 1:30 p. m. of this day, Wednesday, October 20, 1915.

Wednesday, October 20, 1915—1:30 p. m.

FRED T. GREENE resumed the stand for further

Cross-examination.

By Mr. Dickson:

Q. Mr. Greene, speaking of the structure, blending of the ore, quartz or other vein materials in veins, the blending or the structure differs in places, from place to place in one and the same vein frequently, does it not?

A. It does, over certain limits.

Q. Well, you have a different blending in one station of the vein, in one level, than another and one point on the strike differing from that which you have at another point on the strike?

A. In a very large vein of the Rainbow type that would be true. In the smaller veins it is much less the case.

Q. It is more or less the case in all veins, to some extent?

407 A. Yes, to some extent.

Q. You, on direct examination, said something about your prior experience in this district in which you examined the vein system or the system of veins for a very considerable distance west of the property in controversy here?

A. Yes, sir.

Q. And you had followed the Rainbow lode as I understood you?

A. Yes, sir.

Q. A very considerable distance to the west of anything here in controversy?

A. Yes, sir.

Q. What is the course of the Rainbow lode east and west or practically so?

A. It is mostly east and west; there are local variations from that strike.

Q. You regard the Rainbow lode as one of the principal east and west veins?

A. Yes, sir.

Q. In that Rainbow lode as you regard it—does it consist of one individual vein or is it made up of a series of veins or zones, all of them connected or run-together, forming what you call the Rainbow?

A. It is essentially a zone in which there are lenticular veins of ore and sometimes just barren vein material.

Q. Barren granite between them?

A. Barren, as far as the values are concerned, but com-

408 pletely altered as to the character of the granite?

Q. And in places unaltered granite also?

A. I don't recall any place where the granite is entirely unaltered?

Q. Do you know of a raise in the Black Rock near the westerly end within about two hundred feet of the westerly end of the Black Rock claim, that is spoken of by the witnesses for the Black Rock as the long raise?

A. I haven't heard any witnesses of the Black Rock.

Q. Do you know of a raise starting from the 1300 of the Black Rock within about two hundred feet—I can't fix the distance precisely—east of the west end line of that claim, which extends upward continuously uninterrupted practically to the surface or to the Black Rock tunnel, within forty or fifty feet of the surface?

A. There is such a raise.

Q. You have been up it?

A. No, sir, not all through its whole length.

Q. Have you been through most of its length?

A. Yes.

Q. Between what levels?

A. Between——

Q. Starting at the 1300 and going upward?

A. I didn't go up from the thirteen but from our twelve up to our eleven.

409 Q. Your twelve would be where with reference to our thirteen?

A. It would be about forty feet above your thirteen—our twelve would be about 40 feet above your thirteen.

Q. You went from your—go on.

A. From our twelve up to our eleven; our eleven to our ten; our ten to our eight, and our eight to your 400.

Q. You have been that far up it?

A. Yes, sir.

Q. That follows up in a vein all the way?

A. That follows a vein all the way.
Q. That the Elm Orlu vein?
A. No, sir.
Q. The Jersey Blue vein?
A. Yes, sir.
Q. Will you pull down our 1300 level. And for all you know that raise continues on the vein from the highest level at which you have entered it clear up to the Black Rock tunnel?
A. From the lowest level that I referred to up to the Black Rock tunnel, yes.
Q. You haven't got that raise designated on the Black Rock 1300 level, your exhibit 22, have you?
A. No, sir.
Q. Can you designate about where it would be on that map?
410 A. No, I haven't been on the 1300 Black Rock for some considerable time.
Q. Have you it designated on any of the levels above?
A. I think our 1300 shows where it comes into that level.
Q. Let me see that please. Just indicate it please.

(Witness indicates.)

Q. Assuming that that raise designated on your map Exhibit 20 extends practically vertically from there to the 1300 foot level of the Black Rock I wish you would indicate where on the Black Rock it would be shown?
A. If the raise was vertical?
Q. Yes.
A. The raise would be about in there on Exhibit 22.
Q. State how you have indicated it so the record will show it.
A. I have marked it in pencil and will indicate it by the letter "W."
Q. You spoke of an examination you made for some company in 1905 or 1906; what company was that?
A. It was made I presume for the Anaconda Company. It was made under instructions from Mr. Kelly.
Q. Did that include an examination of the Black Rock and Elm Orlu or either of them?
A. No.
Q. Calling your attention to Exhibit No. 4 the general plan map, that portion of the work in which trench- F-2, G, H and L are
411 found, do you regard that as a southeast branch of the Rainbow lode?
A. Yes.
Q. Can you show me there on the next level below where you find that same branch, the first level below the surface?
A. Plaintiff's Exhibit No. 7.
Q. Where is that same branch to which I called your attention on Exhibit 4 shown on Exhibit 7?
A. No. 1 drift here.
Q. What are the dimensions of the vein there pictured, the width?
A. There is a core of quartz with a small selvage on the north

side of from 12 to 16 inches in width, accompanied by three or four feet of very highly altered granite.

Q. Is that on what you have spoken of as the Pyle branch?

A. I don't know.

Q. Well, have you any opinion about that; do you think it is?

A. I should not like to express an opinion as to that.

Q. Do you think that the southwesterly branch shown through trenches E, H, K and L is that Pyle branch?

A. I would not be inclined to say that they were.

Q. You have no opinion one way or the other?

412 A. No; I am inclined to say that they are probably not on the same branch.

Q. Have you taken the dip of this branch showing in No. 1 drift east on Exhibit 7?

A. Yes.

Q. It dips to the south, does it not?

A. Yes, slightly.

Q. From end to end it has a southerly dip?

A. Yes. In this drift it dips south as well as we can measure it, but that is not the complete indication of its dip throughout.

Q. Now, where on the next level below do you find the same branch that is represented on the plan map?

A. Exhibit 8.

Q. Exhibit 8, entitled "Tunnels." Where do you find it on this?

A. In drift 24 of the Black Rock tunnel.

Q. Have you taken the dip there?

A. Yes.

Q. It dips south there, doesn't it?

A. Very little; it is almost vertical there.

Q. But whatever inclination it has got from the vertical is southerly, is it not?

A. The dip in the drift is slightly to the south. The dip between the two drifts would indicate that it is very closely vertical.

Q. By the way, speaking as a whole of the Jersey Blue

413 vein, is it what might be called quite regular in its downward course or dip?

A. No, it is not.

Q. Very erratic?

A. No, not very erratic.

Q. Between what limits of perpendicular and north and south?

A. I don't understand what you mean.

Q. What is the extent of the variation, the maximum amount of variation?

A. Well, the variation is between a minimum dip to the north and a minimum dip to the south.

Q. Well, we will take the maximum dip to the north and the maximum dip to the south?

A. Well, the maximum dip would be vertical. The minimum dip——

Q. Well, how far from the vertical does it pursue its downward course northerly or southerly?

A. In places as high as 15 degrees from the perpendicular.
Q. And southerly how far from the perpendicular?
A. About the same; it would vary from approximately 75 degrees to the south to 75 or 76 degrees to the north.
Q. But, taken as a whole, from top to bottom it is almost vertical?
A. As far as we know it in depth, the top of it is nearly vertical over the bottom, but the divergences between those two points are very considerable.
414 Q. Now, the Pyle strand or the Pyle branch of the Rainbow lode on the different levels, if you were to extend them easterly and westerly with a view to making a connection between the two ends of the Pyle strand, does it also vary in its dip from level to level?
A. Yes, it does vary.
Q. To a very considerable degree, doesn't it?
A. About the same degree as the Jersey Blue.
Q. That would be a maximum variation of 30 degrees?
A. No; it varies from the vertical to a minimum dip to the north of about 15 degrees, or 75.
Q. And a maximum of what?
A. The maximum variation is about 15 degrees.
Q. Doesn't it dip to the south in places?
A. I don't know of any place that it dips to the south.
Q. Will you bring down the map that has the mill tunnel on it?
A. Exhibit No. 9.
Q. This is plaintiff's exhibit 9?
A. Yes.
Q. Have you been in the drift from the little tunnel starting from station 983 through stations 1048, 1110 and thence on to 1118 or thereabouts?
A. Yes, sir.
Q. Have you examined the roof of that drift to see whether there is a continuous vein from end to end of that drift?
415 A. Yes, sir.
Q. And what is the result of your observation?
A. There is no such continuous vein from end to end.
Q. There is no vein shown on the roof of that drift?
A. No, sir.
Q. Nowhere?
A. Oh, yes.
Q. Where?
A. There are little places along up, different places, where there are some quartz, and in two places it is shown on the map here.
Q. Well, how?
A. As a small violet line.
Q. Is that intended to represent a vein?
A. Yes, it is a small vein.
Q. And that station 1118 easterly, to where that blue streak goes out of that drift?
A. There is a distinct fault fissure.
Q. No vein material?

A. There is quartz in the fault fissure.
Q. Do you call quartz vein material?
A. It is vein material, certainly; it is a fault vein of the same type as the northwest-southeast veins.
Q. What is that?
A. It is vein material; it is a fault vein of the same type as the general northwest-southeast veins of the camp.
416 Q. Show me your 100 foot level.
A. The Elm Orlu discovery would be a little west of the workings of this map.
Q. Show me below that please.
A. There is no level in the Elm Orlu below that that we have any maps of.
Q. What, below the 100 foot level?
A. Below the 100 foot level until you get to the 500 foot level.
Q. If you are sure of that you may show me the 500 foot then?

(Here the witness indicated.)

Q. You have here a blue streak starting and running southeasterly from fifty feet or such a matter easterly of the Elm Orlu discovery?
A. Westerly of the Elm Orlu discovery.
Q. Westerly I meant to say.
A. Yes.
Q. Can you show me that in any of the underground workings of the Elm Orlu?
A. Yes, sir.
Q. Please do so?

(Here the witness indicates.)

Q. Where is it shown?
A. It is shown here.
Q. This is exhibit 6?
A. Yes, sir, it is shown in the discovery tunnel about fifteen feet north of station 6.
Q. And running southeasterly between stations 38——
417 A. 34, 35 and 36.
Q. What material was disclosed in that?
A. A clay gouge.
Q. Nothing else; no vein material in that?
A. Oh, there is probably two or three inches of quartz on the wall just south of station 31. Altogether it has possibly three inches in width, including the gouge, and the quartz.
Q. I wish you would show me the map having on it the Black Rock crosscut tunnel and the Dewey tunnel.

(Witness indicates.)

Q. You have already described what we have in the working running southeast from the Black Rock tunnel marked 24?
A. Yes, sir.

Q. I wish you would describe what you had in the Black Rock, colored blue, where we have stations 838 and 837 and 829, 828, and thence southeasterly through space, in the way of vein material.

A. In drift No. 4 at crosscut No. 5 there is a very strong gouge, one to two inches of blue clay, on the north side of the vein, which consists of a few inches of quartz and four or five of broken, altered granite.

Q. Go on?

A. This vein can be followed east along through drift 4. It is shown by a small branch from the south which, in going west, practically pitches down to within a quarter of an inch or so of
418 the gouge. On the east these two have been followed to station 813 at crosscut 2, where it departs from this working.

Q. And have you a vein, what you call vein material, practically from end to end where you have tested it?

A. There is a small vein there.

Q. It seems to be in alignment with the work running southeasterly from the Black Rock crosscut 34, about.

A. They seem to line up the same, but——

Q. And as to the vein material, one is about as prominent as the other?

Mr. Gray: I suggest he be permitted to conclude his answer.

The Court: Well, yes, but I think that is perhaps all he was asked, whether they would line up or not.

Mr. Dickson:

Q. And as to the vein material, there isn't any considerable difference?

A. Not a very noticeable difference.

The Court: Any explanation of that nature I think you can bring out on redirect. I think the answer is full and complete. You may proceed.

Mr. Dickson:

Q. And the vein material found in drift 4 in the Black Rock ground, colored blue, and that you found in the workings marked 24 in the Elm Orlu running southeasterly from the Black Rock crosscut, one is about as important as the other, isn't it?

419 A. Yes, they are both quartz, which is found universally throughout the camp in every vein.

Q. You think it ought not to be rationally correlated?

A. They might be correlated.

Q. Might be on one and the same vein?

A. But——

Q. Answer the question, please, and then you may explain: might be on one and the same vein?

A. I was answering your last question. You were asking me if they could be correlated. I said that they could be correlated but for the fact that their direction and comparison alone is not sufficient

for the reason that they are intercepted by the Black Rock fault and Rainbow lode.

Q. Well, there are fissures that intercept and cross the Rainbow lode on there?

A. Yes.

Q. Might not these two pieces that I have spoken of be on the same vein and cross the Rainbow lode?

A. They might but for the fact that there are a great many such fissures on the same side, and it is not possible to correlate them with the same degree of certainty—or certainty rather, small fissures of that type and character.

Q. You have correlated certain portions of what you believe to be the Black Rock over quite as great an interval and where there was very considerable differences in—the Jersey Blue I meant to
420 say—very considerable differences in the thickness of the Jersey Blue segment, or taken to be, east and west of the Black Rock fault?

A. But generally the Jersey Blue fissure is of much greater magnitude and much more easily recognizable than a number of the small six or eight-inch seams.

Q. Well, put it this way: Take this working running southeasterly from the Black Rock, over which the figures 24 are found; is that referable to what you call the northwest-southeast system of fissuring?

A. It is not as large as most of these veins that are identified.

Q. It has the course?

A. Closely, yes.

Q. Do you think that belongs to the northwest-southeast system that you have spoken of?

A. It might.

Q. Why isn't it colored blue instead of red, then, or left uncolored if you were in doubt about it?

A. Well, I don't know why it was colored red I am sure, as far as my own information is concerned in this particular drift.

Q. Will you turn to your 500 foot level for a moment, Mr. Greene?

A. Exhibit 10.

Q. I call your attention to some work on Exhibit 10 run in a somewhat zig-zag course, in which are found, among other figures, numbers 83, 84, 82, 70, 68, 66, 64 and 65. Was that run under your direction?

421 A. Yes.

Q. And what did it disclose; what were you hunting for?

A. We were hunting for the extension of the vein in 513 crosscut; we thought and believed that we had found it——

Q. Was that the vein in 513 crosscut; is that what you call the Pyle strand?

A. I believe that was the Pyle strand.

Q. Tell us what you found in that zig-zag working from end to end?

A. From 517 crosscut we had a vein possibly 12 inches in width, and that was followed east, and was cut off.

Q. Why is it not colored red?

A. I don't know, I am sure; it ought to have been colored red. It was faulted there by a little northwest-southeast slip, and the drift was turned, believing that we would find it to the east, and we picked up a small seam, a very insignificant one, and followed that for a ways, and that was also faulted, and finally disappeared as a joint plane. That is all there is in that drift.

Q. Then what did you do; what did you drive that for?

A. Later, when we came to that raise from the 500 of the Black Rock we drove out to the northeast, expecting to intercept the seam that we had started from the 450 of the Black Rock on. We ran out to station 84 and found a seam standing at that point nearly
422 perpendicular, and followed it a ways to the southeast, and then they turned on a northwest-southeast seam and followed that to where the raise had holed.

Q. Speaking of the seam that you followed from 67 to 68 and another that you picked up near station 70 and it was cut off again at 77—little seams like that can be found practically all over the district, can they not?

A. Yes.

Q. Running in various directions?

A. Yes.

Q. Apart from any vein?

A. Apart from any vein.

Q. When you brought the raise up to the 450 of the Black Rock—that raise is from the 1000 Elm Orlu, is it not?

A. Yes.

Q. You started off westerly on a seam. Describe that seam; a seam of what; a barren fault fissure or what?

A. On that level?

Q. On this level here?

A. We did not start out westerly; we went easterly, and this was driven easterly as I described it from drift 506.

Q. It is represented as driven westerly from 68 and 69?

A. Through 84 and 88 it was driven westerly, yes.

423 Q. And 89, was this driven westerly and easterly and southeasterly from 84?

A. Yes.

Q. That was done under your direction and after the raise came up?

A. Yes, part of it was done under my direction, but I have not seen it since it was about 25 feet from station 84.

Q. You believe that that raise from the 1,000 foot level up to the 450 foot level had been following up the Pyle branch of the vein, do you?

A. We followed the Pyle branch of the vein.

Q. And this work driven out from 83 to 84 and thence the work easterly and westerly therefrom was done with a view of finding if you could the Pyle branch at that level?

A. It was done in an endeavor to find the Pyle branch at that level.

Q. What did you find in that level from 84 to 89 in the westerly portion?

A. I cannot answer that question.

Q. How far have you been in there?

A. 25 feet.

Q. What did you find there?

A. A small vein with eight or ten inches of quartz in it.

Q. How small; give us some idea of its dimensions?

A. I am trying to do that; I just said with eight or ten
424 inches of quartz in it, with a gouge on the north side and crushed granite extending a foot or more on the south.

Q. Have you been in that part easterly or southeasterly from 84?

A. Yes, sir.

Q. And is there about the same appearance there, as far as vein material is concerned?

A. Just about, not any more.

Q. And in that portion that you found in it westerly from station 84 it dips to the south, does it not?

A. At the crosscut it is almost perpendicular; it dips about 84 or 83 to the south. In the face as I saw it last it dipped about 80 degrees to the south.

Q. And that part southeasterly from 84 dipped to the south also?

A. Yes, those particular seams do.

Q. Bring down the 700 foot level of the Elm Orlu, please?

A. There was very little working on the 700 of the Elm Orlu; it does not show anything very much.

Q. The 700 Elm Orlu and the 800 Black Rock are on the same map, aren't they?

A. No, sir.

Q. Well, bring down the 700 and let us see it—well, bring down the 800 and let me see that?

A. Exhibit 14 shows the 700 of the Black Rock.

Q. I call your attention to a drift over which are found the figures 702, represented in blue, and running easterly from what is
425 shown in red as the Rainbow vein, to and across crosscut 701. I will ask you if in that 702 drift you do not find seams of quartz, unmistakable vein matter, that are cut off by other fault seams at intervals in several places?

A. I don't know. What was the magnitude of these seams; I want to get some sort of picture of it in my mind so that I can remember it.

Q. Well, I don't know the size. I ask you if you did not find running lengthwise in that drift quartz seams that have been interrupted and cut off by a later fault seam?

A. East of the raise in 792 drift I find no quartz seams large enough to take any notice of.

Q. Well, at or in the immediate vicinity of the raise do you find quartz seams that are cut off by later seams or fissures?

A. We find very, very solid quartz and zinc vein material cut off by the Jersey Blue vein.

Q. And cut off by nothing else?

A. No, sir, cut off by nothing else.

Q. Have you the notes of what you observed in that 702 drift?

A. Yes.

Q. I wish you would get them and read them if it will not take too much time?

A. Well, my notes——

Q. Show us what you encountered from that 702; which way do you want to start; at the westerly end?

426 A. No, I followed the drift as it was worked from the 701 crosscut westerly.

Q. All right, it won't take but a moment.

A. At 702 crosscut I found a marked vein, with one inch of clay and two seams of quartz and manganese from 4 to 8 inches in width departing from that crosscut at south 76 degrees east and dipping in the crosscut to the south 86 degrees. The drift follows along a distinct vein with varying amounts of quartz through this drift, until at a point about 70 feet west of 701 crosscut I find the vein has turned and dips slightly to the north at an angle of 87 degrees. The vein crosses, east of the raise, from the south side to the north side of this drift, and the drift turns to the north, following the curving of the Jersey Blue as it approaches the Black Rock fault.

Q. Is that all?

A. My notes are a picture of it; they are not descriptive in words.

Q. As I understand, nowhere in that drift do you find the quartz seams that you have noted cut off?

A. I don't find any quartz seams of importance in there that are cut off by anything.

Q. Well, unimportant?

A. I don't take cognizance of every joint plane and little crack and crevice and crystal in the mines. Those quartz seams, if such exist in there, are too unimportant to bother with.

Q. Give me the 1200 of the Black Rock?

427 A. Exhibit 21.

Q. Point out to the court the raise that you spoke of on direct examination that goes from the 1,200 to the 1,000 level in the Black Rock mine, and then was taken up by the Elm Orlu people and carried on up to the 450 foot level.

A. The raise marked "X."

Q. Did you go up that raise; I suppose of course you have been up it more than once?

A. I have never been in that raise at all.

Q. Never anywhere below the 1,000 foot level?

A. No, sir; it has never been open since I have been there.

Q. On direct examination you indicated by the letter "X" where that raise started from the 1,200?

A. Yes, sir.

Q. It was started there at a point northerly of what you have represented on this map as the Jersey Blue vein?

A. Yes.

Q. Now, bring down the 1,000 of the Black Rock; that is the

same raise that Mr. Pyle spoke of, that he and Senator Clark had gone up?

A. I did not hear Mr. Pyle, but I did hear Mr. Clark say that they had gone up it.

Q. Where is that in Exhibit 18?

A. It is just east of crosscut 1001?

Q. And there, according to the picture on Exhibit 18, the Jersey Blue vein is north of that raise?

428 A. Yes, sir.

Q. The raise, then, if these two pictures are true, somewhere between the 1,200 and the 1,000 must have cut through the Jersey Blue vein in its course upward?

A. Yes. As I understand it, however, the raise was not started as a single simple working from the 1,200 Black Rock up to the 1,000, but was a raise started out of the back of the stopes.

Q. Several sets above?

A. Several sets above the sill, yes.

Q. Well, if on the 1,200 foot level the Jersey Blue has the position represented on that level and on the other map, and the Jersey Blue with reference to the raise at the 1,000 is correctly represented here, then somewhere in the upward course of that raise they must have cut through the Jersey Blue vein?

A. If the raise started from the stopes south of where the Jersey Blue vein exists in the stopes it would not.

Q. Well, it is represented on the 1,200 foot level of the Black Rock on your maps as having started south, if where you put the mark "X" is correct?

A. Well, that is only partly true. That raise as marked on the 1,200 is evidently a stope raise, not a raise that was started as a single working from it.

Q. I understand that, but as shown on the map——

A. As shown on the map at the bottom it is a chute for the disposal of material stoped above it.

429 Q. Bring down your 1,400 foot level of the Elm Orlu?

A. Exhibit 22.

Q. Is there a raise going up from the 1,400 of the Elm Orlu to the 1,300 and on up to the 1,200?

A. Yes, sir.

Q. Where does that start?

A. It starts in drift No. 1406.

Q. Near station 11?

A. Yes.

Q. Does that go up in the Rainbow vein?

A. Yes, it goes up and goes through the Rainbow lode from the 1,400 to the 1,300.

Q. And from the 1,300 doesn't it go on up to the 1,200?

A. From the 1,300 it goes on up to the 1,200, but relieves the Rainbow lode shortly above its hanging wall and above the 1,300.

Q. Bring down the 1,300 of the Elm Orlu?

A. Plaintiff's Exhibit 20.

Q. What is the greatest width of vein you get there, of the Rainbow; about 180 feet?

A. Yes.

Q. Show me the level 50 feet below that?

A. Exhibit 21.

Q. How far easterly of the west end line of the Elm Orlu was it on the 1,300 foot level of the Elm Orlu, where you had 130 feet in width of the vein?

A. Oh, roughly it is possibly 850 feet east.

430 Q. I wish you would give me that. It won't take but a minute?

A. 1307 crosscut there is 850 feet exactly, we have 180 feet of width.

Q. And 850 feet on the 1200 Black Rock easterly from the west end line of the Elm Orlu?

A. Yes.

Q. Where, and how far from the southeast corner of the Black Rock claim was it that you testified the foot fall boundary of the Rainbow lode crosses the common line between the Elm Orlu and Black Rock veins?

A. I didn't go as far south; I never have surveyed it.

Q. Will you do so now—I thought you said 25 feet west from shaft "E?"

A. I gave them all as being 25 feet from the east end of "E," trench "E."

Q. Mark that on Exhibit 4. How far easterly from the southwest corner of the Black Rock?

A. That is 298 feet.

Q. What?

A. 298 feet.

Q. I wish you would describe what you have in that trench "E," where it crosses the vein?

A. At that particular point there is a quartz seam from six to eight inches in width.

Q. And westerly of that what do you have?

431 A. Westerly of that you have very highly altered granite.

Q. For what distance?

A. For a distance possibly about twenty-five feet.

Q. Does it carry any values?

A. I don't know yet that it does.

Q. And westerly of that in the crosscut what have you next?

A. Well very small quartz seam about five feet in width.

Q. And thence, west of that?

A. West of that is a very heavy gouge some eight inches in width. West of that and to the end of the trench——

Q. These running in the direction of the vein in that locality?

A. Yes, sir.

Q. How thick is that gouge?

A. I should say it is about eight inches thick.

Q. Will you indicate about where that gouge would be on your Exhibit 4?

A. It is marked here in green.

Q. Is there much or little—is the granite in that region aplite?

A. I have seen a few dykes of aplite in the region.

Q. Isn't it found in many pieces of ground apart from any vein at all?

A. The aplite dykes that I have seen are apart from the

432 veins.

Q. Haven't you found any except in the form of dykes?

A. I don't recognize it as aplite.

Q. What is aplite?

A. Aplite is an acid intrusion composed of felspar and quartz.

Q. Where you have aplite in the granite it is very silicious; that is what it is, isn't it?

A. In the dykes it is characteristically aplite, but I think what you are referring to I would call pegmatite.

Q. Do you know what I mean when I asked you about aplite?

A. I believe you refer to what I recognize as pegmatite.

Q. It is highly silicious—where it is highly silicified in what respect does it differ from quartz?

A. Why, in the crystalline character and structure of the rock and contents of it. Pegmatite has felspar in it.

Q. Readily distinguishable by the eye?

A. Usually, except near the surface the oxidization is so complete that it is hard to tell whether it is granite or pegmatite.

Q. Whether it is quartz or aplite?

A. No, I don't think it is hard to tell whether it is quartz or aplite.

Q. Hard to tell what?

A. Whether it is pegmatite or the ordinary granite of the district.

433 Q. In the westerly portion of the Rainbow lode as depicted upon the map—and what I mean by that is within a few hundred feet of the easterly end line of the Black Rock claim—the Jersey Blue vein and the Rainbow vein as designated by you from the 1100 foot level downward are continuously approaching each other and finally come together or intersect?

A. They come together, yes.

Q. Now, before they come together, in the wedge of ground between the Jersey Blue vein and the Rainbow vein, isn't that wedge of ground very much shattered and broken and crushed in many directions?

A. Where they are close together it is usually shattered and broken.

Q. Well, where they are one hundred—within one hundred feet of each other haven't you the conditions there that you would naturally expect from the opening of two fissures as close together as these, that the intervening country would be much displaced, fractured, broken, cracked in various directions?

A. It is broken but not extremely so. When they are one hundred feet apart the breaking is not remarkable as compared to remote portions of the granite, remote portions of the country rock.

Q. In that wedge of ground, where they come within one hun-

dred feet of each other and from this on down, until they finally intermingle, aren't there fissures running in many directions?

A. There is everywhere in the granite.

434 Q. Well, more so in this wedge of ground naturally, I would suppose, isn't it true, Mr. Greene?

A. I don't recognize it; I don't think it is any more there than anywhere else. I haven't observed that in this crosscut.

Q. Isn't it sufficiently ruptured and fractured, that intervening wedge, to allow a ready passage for the ascending solutions that came from one or the other of the fissures, up into them?

A. I don't know what it was when the solutions went through there.

Q. Now, now?

A. No, I think there is enough anywhere almost in the camp to allow a certain amount of percolation of solutions.

Q. But in this place; I don't care about anywhere else; in this wedge of ground—you know what I am speaking about—from the 1100 down to where the two veins intersect, isn't that intervening wedge of ground so ruptered, fractured and broken as to afford a ready passageway for the ascending solutions?

A. At the present moment, yes.

The Court: This word "pegmatite" that you have mention- strikes me as something new in the mining litigation in this district. How long has that been in vogue?

A. I think it has been mentioned a great many times as distinguishing a certain kind of granite which we call pegmatite from aplite.

435 The Court: Does it resemble aplite?

A. Very closely, yes. There are differences in the quartz usually.

Mr. Dickson: Let me have the 1,400 foot of the Elm Orlu. Have you a raise on the 1,400 foot level starting up near the easterly end of the 1,410 drift?

A. That raise starts from just under the "O."

Q. In "Orlu?"

A. Yes, the "O" in Orlu, in the 1410 drift.

Q. Is that in the Rainbow lode, that raise?

A. I think not.

Q. What vein is it in?

A. It is in the Black Rock fault. I have not seen the raise.

Q. Haven't you at the bottom of that raise twelve or thirteen feet of zinc ore?

A. I don't know; I haven't seen the point where the raise comes in.

Q. Have you been down there—have you been down a raise from the place where you have designated to the 1500?

A. No, that is all very recent working, done in the last two weeks.

Q. And do you know that the raise continues upwards from the 1400 foot, from the point you have designated, to the 1300?

A. My knowledge of the raise is confined entirely to correspondence.

Q. You know personally nothing about it?

436 A. I personally know nothing about it. The drift, when I last saw it, 1410 drift had reached the Black Rock fault and then stopped. We were then asked to extend it to a certain place and start a raise, which I believe has been done.

Q. But you never saw the raise?

A. I might have, in the last two or three weeks.

Redirect examination.

By Mr. Gray:

Q. Will you take 450 Black Rock? Is this the tunnel?

A. No.

Q. I wish you would get it, the two of them together. Referring first, Mr. Greene, to the northwest fault that you have described in the drifts from 834 to 839, if that were projected, where would it lay with reference to the Black Rock shaft?

A. It would be north of the Black Rock shaft.

Q. Now, coming to the 450-400 level and this 401 crosscut, you were asked why that was not shown, or if it was shown in the 401 crosscut. Will you now indicate to the court approximately on that level where that would be if projected from the tunnel to the 400 level, or the 450 foot level?

A. Well, it is nearly vertical and it should lay on this level close almost as near that northeast location corner of the Elm Orlu as it does on the level below, possibly a little further to the south because there is a very slight dip to the south.

437 Q. Projected on its course northwesterly, where would it probably be cut in that crosscut?

A. It would be intercepted by the stringer of the Black Rock fault before it reached that crosscut and be displaced somewhat.

Q. And the seam or strand of the Black Rock fault is shown just south of the Black Rock shaft on the 400 level, or 450 foot level?

A. That is on the 400, that it is observable?

Q. From that point to a point near station 27A what is the character of the ground?

A. Well, on the 450, immediately below station 276 the ground is very badly crushed and broken.

Q. Projected, in your judgment then, this northwest fissure would be displaced, affected by the Black Rock fault in that territory, on that level?

A. Yes, sir.

(Witness excused.)

Testimony of John D. Irving for the Plaintiff.

JOHN D. IRVING, called as a witness on behalf of the plaintiff, being first duly sworn, testified as follows:

Direct examination.

By Mr. Gray:

Q. State your name and residence?

A. John D. Irving; New Haven, Connecticut.

Q. Your profession and occupation?

438 A. I am professor of economic geology in the Sheffield Scientific School of Yale University.

Q. Professor, will you please state where you were educated for your profession?

A. I was graduated in 1896 from Columbia University and then a course in the graduate school in geology and mining, taking a doctor's degree in 1899.

Q. From that time will you just state what experience you have had and where, in the practice of your profession?

A. On leaving the University I took a position on the United States Geological Survey where I remained for a period of four years, a little over four years. During that time I was first employed in making a study for the United States Survey of the geology of the mining district of the North Black Hills, on which I wrote a report which was published some years ago. After that I spent a year for them in the Connellsville coal region. The following year in the Leadville district in Colorado, where I made a study of the mines for a report which was first intended to be prepared by Mr. F. S. Emmons, and myself, but after his death I took over that work and have been preparing that monograph for the last ten or fifteen years. Then I examined the Globe Copper district for the Survey in Arizona and did some work for them in the Park City district in Utah. In 1902—'2 or '3—I don't remember the exact date—I took the position of professor of mining and geology in the University of

439 Wyoming which I held for about eight months and went from there to the Lehigh University at Bethlehem, Pennsylvania, where I was assistant professor of geology first and then professor of geology and was in that university for a period of four years. At the conclusion of that time I was called to the position in New Haven, at Yale University, which I have occupied until the present time. During my work at Lehigh for some years I retained my position on the survey and studied in the Ouray Valley and Lake City Valley, the Needle Mountains district into the south of the Ouray, and then before going to New Haven I was geologist during the summer of 1907 for the Alaska Syndicate, which consists of the Guggenheim Exploration Company and J. P. Morgan & Company and examined the Kennicott mines in Alaska and made a geological report on them and a number of other properties. During my stay

at New Haven I have spent my summers partly in various ways, making commercial reports in Arizona and Nevada or Nevada and Colorado, and have studied the mines in Sweden and some of them in Germany.

Q. You have examined the Elm Orlu and the Black Rock mines, professor?

A. I have.

Q. For how long have you been acquainted with those properties?

A. Ever since my first arrival here in Butte, some time a year ago last July.

Q. Since that time approximately how much time have
440 you spent in the surface and underground investigation of these properties?

A. About ten weeks in all, aggregate.

Q. Will you state whether or not you have examined, as well as may be, the surface of the claims?

A. I have.

Q. Have you been in the underground—all of the accessible underground workings or practically all of them?

A. Most of them; not quite all of them.

Q. What were the purposes of your examination and study, professor?

A. To form an idea of the structural geology, relations of the various veins and ore deposits on the property, with an idea of their relation to the apex questions involved in this present litigation.

Q. In that connection, have you studied the character of the rock and the material both in and outside the veins, in these properties?

A. I have.

Q. Just briefly, in advance of going into a description of what you found in the properties, will you state what the country rock that you found there is and particularly in that connection I wish you would refer to aplite and pegmatite and state what differences there are between them?

A. The country rock in the district, in this portion of the district and a large area beyond this region, is granite, sometimes
441 called quartz monzonite, if you want to be extremely accurate, but granite is a perfectly satisfactory name—a uniform grade of granite, and in that granite I found dykes and sometimes horizontal layers, or nearly horizontal layers, including layers of a finer granite, a granite which is white, does not contain the dark colored minerals which give the speckled appearance to granite, but consists of felspar and quartz, sometimes with a little white mica in it. In addition to this fine granite which we call aplite there is also a coarser phase of the same rock which is usually spoken of as pegmatite. That is also light colored but it is somewhat coarser in grain, contains quartz and felspar and often other minerals, tourmaline and sometimes a little pyrite and calcopyrite, not very much as a rule. That sometimes shades off gradually into the surrounding granite.

Q. Does it appear in the dykes?

A. It usually is not definitely marked by boundaries the way the finer grained varieties of it are.

Q. That is the aplite?

A. The aplite.

Q. Without necessarily asking you questions, will you state from your examination and study what you have found underneath these properties and within them, the geological structure of the veins there and their relation one to the other, and their relative ages. In connection with that use any sections you may desire?

A. After the consolidation of the granite and the aplite,
442 probably a very long time afterwards, the rock was broken and shattered and cracks and fissures formed in it. These cracks and fissures probably were never of any very great width; that is they probably never stood open with a large amount of space in between the walls, but were rather narrow cracks, sometimes grouped together in pairs, series. Subsequently a solution here, in entering these fractures very largely altered them chemically, dissolving a little of the rock and substituting a little of the vein mineral or ore, and by re-placement of the rock these pieces of rock between these fractured parts have been altered into vein mineral and ore. Now, all of the fractures that were formed in this granite country rock were not formed at the same time. There are indications in this area of the formation of fractures in the country rock at three distinct periods of time, a first or older group of fractures; then a period in which no fracturing took place and the forces were accumulating for the formation of the next series of fractures; then a second series of fractures formed and then another interval in which there was no fracturing, and then finally a third series of fractures formed. There may have been others but we have evidences of no others in this property in question. Now, after the formation of the vein first in these fractures in the rocks mineralizing solutions circulated through the openings so provided and altered the country rock into ore and vein minerals and formed the veins which we find on this property and the adjacent territory.

443 That vein formation or mineralization continued from its first inception for a long period of time, and the second series of fractures which we find in this area was mineralized during what I believe to have been the same period of mineralizing action. But before the third series of fractures were formed, the mineralization had practically died out or ceased, so that the third series of fractures are not mineralized at all, or, if mineralized at all, are mineralized so little that we can find very little evidence of it. In other words, we have two groups of fracturing within the mineralizing period, or within the time when thermal action or mineralization or deposition was going on, and the third group of fracturing after that, in which there was no mineral deposited.

Now, to make the pertinence of this discussion of fractures clearer, I might give a brief classification by name of the lodes in this part of the Butte District where the property is located. We have the oldest group of all, which I will call the Rainbow group, east and west lodes, broad lodes, which are broad zones of fracturing, in which

water circulated, and which were heavily mineralized during the early stages of the mineralizing actions when the thermal waters were acting at their greatest intensity. Later on, when mineralization was not so strong, a second series of fractures came through the first, and that series again was extensively mineralized, and to them

I have given the name of the fault vein group—or the name
444 is customarily given—and then after those two types of veins were formed, the third group, or unmineralized group, represented on this map by the Black Rock fault. Now, I would like to describe the characteristics of those three types of fractures or lodes. The oldest, or most ancient, that is the Rainbow group; the next are represented by the Jersey Blue, known as the fault vein group, and the last are those, the youngest of all, to which I have given the name the unmineralized fracture group.

Taking up first the Rainbow group, of which the Rainbow lode here is the example in this portion of the district: This type of lode in the first place has a general east and west direction; it varies a little from that, but its general trend is in an east and west direction. The lode is very broad; that is to say, the zone of shattering which provided an opportunity for mineralization was very wide. The Rainbow group of lodes, or the Rainbow lode here, is very irregular; it breaks off into numerous strands and branches and offshoots, which run out into the rock at the sides. It is displaced and broken naturally, being the oldest of the vein series, the most ancient—it is broken by both of the other two vein series in many places, consequently the most faulted of all of them.

Now, taking up the next group of veins, or the northwest-southeast series: The first characteristic of them is that they have a general northwest-southeast trend or direction or strike. In the
445 second place they are relatively narrow, sometimes 25 or 30 feet wide, but usually smaller than that. In the third place they have characteristic gouges or selvages along their course, forming either one wall or the other or sometimes both, which are practically never absent in any of this type of veins that I have seen. As compared with the characteristics of the Rainbow group that is quite striking, because the Rainbow ore is frequently frozen solidly to the rock, with no line of selvage or clay occupying the space between them. More than that, the lodes of the Rainbow group in their boundaries sometimes fade off—the minerals—gradually into the country rock, more or less mineral being disseminated, and left closely together, until we finally get into entirely barren rock. In the case of the northwest-southeast fissures that is a comparatively rare thing to find; that is to say, the mineral material is usually included between the clay selvages or gouge which forms the limiting walls. Sometimes they do fade off a little into the granite country rock, because they are both largely formed by replacement, but generally speaking in the northwest-southeast series the ore is included between selvage walls, but not always. Another characteristic of the northwest-southeast series is that the mineral material which is deposited along them is discontinuous. We find in a certain portion of the lode mineral material like quartz and manganese and zinc

ore in the vein or fissures, and then there will be an area or a space along the lode in which there is practically nothing in the
446 lode at all except a narrow ribbon of blue clay; then further on another body of mineral material will be found, and then perhaps again another area of blue clay in which the vein dwindles down to such a narrow ribbon that it is sometimes quite difficult to follow. It is needless to say that the Jersey Blue group, or I should say the fault vein group, is not so frequently faulted itself or displaced by faults, inasmuch as it was formed later, and is itself a member of the group of fissures which does a large portion of the faulting. And there is only one series of fissures which interrupt the continuity of the fault vein group, and that is the last of the three groups which I have mentioned. Examples of the northwest-southeast series of fault veins are the Jersey Blue on the property of the Elm Orlu — Black Rock Companies, shown by the blue line on the map, Exhibit 4; other members of the same series are the copper veins found in the lower levels, or known best in the lower levels of the Elm Orlu mine, and a number of veins which I have seen over in this portion of the district, immediately south of the Elm Orlu claim, including the Edith May and the Jessie. In addition to these examples there are a great many smaller fissures of this fault vein group, which, not having been followed out, of course are known only for short distances along their strike.

Q. Professor, before you leave that, you spoke of the offshoots from the Rainbow lode as being one of the characteristics
447 of it. Do you find the same to be true of the fault group, like the Jersey Blue?

A. No, that was another point of distinction between the two which I had intended to mention. The fault veins do sometimes, I think, have branches, but the branching of these fault fissures is relatively rare as compared to the Rainbow lode, which is made up not only of large numbers of separate strands, but is also characterized by these offshoots which finger out into the country rock. It is quite a constant distinction between the two. It is not absolutely true that we do not ever get branching in the Jersey Blue or in the fault vein group, because we sometimes do, but in general the distinction is quite striking.

Now, the third type or the third group of fissures is represented here by the Black Rock fault, and comprises a group of unmineralized fractures which are generally lined with heavy, thick, plastic clay, sometimes as much as 18 inches and possibly more in thickness, very tough, almost like leather, which will almost tear. In places in them we frequently find embedded angular fragments of quartz and country rock, as is to be expected in a fissure along which a large amount of movement or faulting has taken place. The members of this fault group series are characterized by being separated sometimes into several strands or a number of planes that will separate, divert a little, and often come together again both in strike and in dip; so that we frequently find along the course of the northeast-southwest members of the unmineralized group,

448 places where the faulting is divided along a number of surfaces or planes. That is a characteristic, not only of these veins, but of others that I have observed in other places in general. The strike of the youngest fault is northeast and southwest. As far as I have seen, there is no mineralization along the Black Rock fault, which is the great member or representative of the unmineralized fault group. As I said, the representative of this unmineralized fault group or latest fissure in this property here is the Black Rock, which is represented by the green line on Exhibit 4, running from the west end line of the Elm Orlu claim in a northeasterly direction, crossing over the south side line of the Black Rock, over the north side line of the Black Rock and into the claim beyond.

Now, to take up the detail of the veins and faults in the property in question: All three of these groups of veins and fissures which I have described are represented there. I have been trying to describe in general the differences between the different types. The only representative we have of the east-west series, the most ancient series in the property of the Elm Orlu and Black Rock, is the Rainbow lode. The Jersey Blue is the most important representative of the fault vein group, and there are others, some of which I have already mentioned, but one very important one is the one sometimes spoken of, and which Mr. Green has described as the Deadwood fault, which does not show on the surface map, and I will describe it a little

449 later on. There are also numbers of other smaller northwest-southeast fault veins of the second series. Representative of the northeast-southwest series of unmineralized fissures is the Black Rock fault.

Now, to take up the Rainbow lode. The Rainbow lode is one of the oldest and best known of the lodes or veins in the Butte district. It is an exceedingly conspicuous large lode, which can be extremely easily traced on the surface. I have followed the Rainbow lode from the Amy-Silversmith shaft to the west of this portion of the country, eastward for approximately for a mile and a half, until it finally crosses over the west end line of the Elm Orlu property. Its course is marked by a series of very striking outcrops, open pits due to caved stopes, and forms quite a conspicuous feature of the topography. Its character of being made up of numbers of strands is just as characteristic as near as I could see from surface observation in the portion which lies to the west of the Elm Orlu as in that portion which is included on the map Exhibit 4. The Rainbow lode within the limits of the Elm Orlu and the Black Rock veins has produced large tonnages of ore, and stopes extend downward for depths of 1500 feet from the surface, both under the Elm Orlu claim and under the Black Rock claim to the northeast. The character of the mineral of which the Rainbow lode is composed, or the minerals which are found in it are quartz, zinc blende or sphalerite, sulphide of zinc, rhodochrosite, rhodonite, barytes, and cerusite, a little oc-

450 casional galena, a good deal of pyrite, which is usually found in the rock adjacent to the more solid portion of the ore rather than in the actual solid ore itself, and occasionally a little chalcopyrite, and a few other copper minerals, but they are very

insignificant in their quantity and kind. One of the things that is noticeable about the mineralogical character of the ore in the Rainbow lode, as well as the ore in the northwest-southeast vein series is that you cannot distinguish any difference in the minerals which are found in those two lodes; all of the minerals which occur in the Rainbow lode occur also in the Jersey Blue and in the other northwest-southeast fault vein series. You cannot make a distinction between the two on the basis of mineralogy, nor on the basis of the succession of minerals, by which I mean that in the Rainbow lode, as in most ore deposits, you will find that there are certain minerals deposited first, and then other minerals which were deposited afterwards, the first mineral material being shattered and broken and *the* later going through it and so on—there is no succession which we can find in the Rainbow lode which we cannot duplicate by observation in the Jersey Blue, so there is no distinction to be made between the two on the basis of mineralogy. There are certain structural features about the Rainbow lode which are quite striking. The lode is usually banded; that is to say, it is divided up into a number of layers, which are usually parallel to the walls of the lode, or approximately so. In some cases they do not appear to
451 preserve a parallelism. That banding is due to the fact that the fractures have formed in the rock parallel to one another, and mineralizing water circulating through them frequently failed to completely alter all of the country rock into ore, and layers of clay or granite will lie in between two successive bands. The result is that the structure of the Rainbow lode is found strikingly banded, and that the banding, as I say, has a rough parallelism to the border or walls of the lode where they are sufficiently developed to be actually observed. The same banding is found, it is true, in the fault vein series also, but it is generally not quite so conspicuous, but it is very characteristic of the Rainbow lode. In some portions of the lode the ore material is not so banded, but is more or less structureless in character; that is presumably because the rock, when it was fractured, was broken up into numbers or aggregations of fragments, and mineralization of those has failed to give us the usual banded character of the ore which can generally or very often be observed. The fact that the shattering of the rock has been greater in amount in some portions of the Rainbow lode than in others—that is to say, supposing one might proceed across the vein in a north and south direction at any particular level, we would find banding for a little ways, shattering, and then an unshattered portion, then some more shattering, and the result of the mineralization of that sort of a group of fractures is that a horse or mass of country rock unmin-
452 eralized or without being transformed into ore, has been left within the vein, and one of the structural characteristics or peculiarities of the Rainbow lode is that we frequently do find these horses or masses of granite within the lode. That granite is usually altered very highly, and in that respect differs from the unaffected or unaltered granite of the surrounding country rock.

The north and south walls of the Rainbow lode, within the area of these claims, offer a considerable contrast to one another. The

north wall is generally much more regular than the south wall. The north wall is very completely separated by a layer of selvage from the adjacent rock. The south wall, on the other hand, is extremely irregular, and has many more places where we find the mineral material or vein material fading off into the country rock than is the case on the north. There are many more cases in which we find offshoots on the south, branches, forks and strands, than we do on the north. There is one case in which a small offshoot is found on the north, but only one as far as I have been able to observe. It does not amount to very much. When I go through the several levels to follow this Rainbow vein through the workings, I will point that offshoot out on the north—I say offshoot—perhaps I ought not to use that word; it is an irregular bunch of ore lying to the north of the main Rainbow lode.

Q. Mr. Irving, will you take now the section which you have and which has already been marked——

453 Mr. Gray: I would like to have sections 27 to 32 offered in evidence.

Mr. Kremer: All under the same conditions. I understand we have an agreement, an agreement with reference to both the maps of the plaintiff and the defendant.

Said sections were admitted in evidence and numbered from 27 to 32 inclusive.

Mr. Gray:

Q. Will you take this section and trace the Rainbow lode which you have been describing and trace its dip, downward course?

A. The series of sections which we have prepared are a series of north and south sections running through the Elm Orlu claim and Jersey Blue to the north and successively appearing along the co-ordinate line from the west to the east. I shall take up the section which appears a little to the east of the Elm Orlu shaft, which is our No. 2 and then we will take successively those which come farther and farther to the east until I get to that one which lays about sixty-five feet approximately east of the Black Rock shaft. In this section we have the elevation marked above some levels with green lines. The workings cut by the sections are shown on the sections and the dotted lines are those workings which do not appear actually in the section but close to it and are projected on to it. The red coloring on the section indicates the Rainbow lode. The green indicates the Black Rock fault, its various strands, and the blue—none of which appears on this first section No. 2—indicates, when we have it on the
454 sections, the Jersey Blue or other northwest-southeast fault veins. On section 2 which lies a little to the east of the Elm Orlu shaft one can see the shaft projected here in a dotted line on the section—we find the Rainbow lode at the top rather comparatively narrow, having a width where it crosses the discovery tunnel of about twenty-eight feet. I shall not attempt to describe in detail the width but simply to point out the general facts of the lead as it passes from

the upper level or the surface down to the lower levels of the mine. As it is followed downward it preserves approximately the same width on this section until it reaches the Elm Orlu seven hundred level. There it begins to increase in width until it has attained a very considerable width on the 1,000 foot level of the Elm Orlu mine. There it has a width of about 120 feet. The dip of the northwestern portion of the Elm Orlu is, in its upper part, slightly towards the south, but as it goes downward below the 900 foot level of the Elm Orlu it gradually bends and the north wall assumes a northerly dip, carrying it practically towards the north boundary of the Elm Orlu property. At the point between the one thousand and 1,100 Elm Orlu where the ore is shown here as not divided off by a sharp line, something which will repeat itself in these sections in various places, the ore probably gradually fades off into country rock, although we do not know just where it goes. On the next section, section No. 3, which occupies this position on the general map (indicating)

455 we see the Rainbow lode still preserving its steep, nearly vertical position, but with a slight dip towards the south, composed near the top of two strands which are believed to unite in depth, although I am not familiar with the work above the 500 foot level. Going on downward, widening and carrying between the 700 Elm Orlu and the 1,100 Elm Orlu some large stopes, assuming again in its north wall a shallow dip towards the north, which is again carrying it over towards the north boundary of the Elm Orlu claim. The Black Rock fault I shall not speak of here as we shall run through the sections with that later on. The next succeeding section, No. 4, we see again the same feature of the southerly dip in the upper portion and then down in the lower levels, beginning at the 1,000 foot level of the Elm Orlu a northerly dip which is carrying it again towards the northerly line of the Elm Orlu claim. In this section also is shown a division into two strands at the top, which are believed to unite as one follows them down. Section 5 shows again the division of the Rainbow lode into two strands in its upper portion; again a slight dip towards the south—or a steep dip slightly towards the south and widening in depth, and below the 1,000 Elm Orlu again a dip of the north wall towards the north.

Q. Show the plane of the section on the map?

A. That section is at this point here (indicating).

The Court: Are they at regular distances apart to the east?

456 A. All except two of them, Judge. There are two sections which we haven't reached yet which are at irregular distances. The others are one hundred feet apart. Section 5 is 1,000 feet west. That is correct as I have stated it; section 5 is along this line here (indicating).

Mr. Dickson: Better designate the line.

A. 1,000 feet; 1,000 feet west of zero. This again shows a southerly dip down to the 1,000 Elm Orlu and then northerly dip below that; the great width of the vein as one proceeds to depth. It also shows one of the northwest veins, a copper vein, colored in blue, and the Jersey Blue, which we can discuss later on. Section 6, 900 feet to the west of the zero point, at this point, along this line (indicating)

shows a much wider portion near the surface, narrowing as one comes towards the 500 Elm Orlu, still preserving that slight southerly dip, and below a point about fifty feet above the Elm Orlu 1000 assuming a northerly dip which carries it over on to the Jersey Blue claim. The other veins I will consider later on. Section 7 is on the line 800 feet west of zero, shows the red vein wide at the surface, narrowing down to a relatively narrow width on the 500 Elm Orlu, and then showing again that southerly dip, which changes on the Elm Orlu 1,000 foot level again to a northerly dip, which carries it over the north side line of the Elm Orlu into the Black Rock claim. I spoke, in describing the differences between the two walls of the vein, of some

457 strands or parts of strands—I spoke of some strands on the north side which we believe to be a part of the Rainbow separation. One of these is shown on section 7 which has been followed up by a raise from the Elm Orlu 1,200 to Elm Orlu 1,100; from 1,100 up to the Elm Orlu 1,000 and then for a distance of approximately fifty feet above that level. The irregularity of the southern wall will show on this section. The lode as you see here has a nearly regular wall on the north side but as one follows it down the south wall shows a gradual fading off into the granite, at least as far as we know about it it has that character at this point. Section 8 is on the line 700 feet west shown here (indicating) shows the same character again, of a southerly dip in its upper portion until it reaches here and passes a little below the 800 level of the Elm Orlu where it begins to show signs of a dip toward the north, it straightens up again a little until half way between the 1,000 and 1,100 Elm Orlu it assumes a slow shallowing northerly dip and is carried across the north side line of the Elm Orlu into the Black Rock claim. Again we see in the lower portion how extremely irregular the southern wall *it* is and how relatively regular the northern wall is. That seems to be all that we have prepared.

Q. Mr. Irving, will you now take up the Pyle strand and——

A. I will not be able to show the Pyle strand on the section because that doesn't go sufficiently far towards the east.

458 Q. Discuss it, if you will though, as you have observed it?

Mr. Dickson: Mr. Gray, do you expect to have a cross section of the raise that goes up from 1200 Black Rock to the 450 of the Elm Orlu on what you call the Pyle strand; will you have a cross section through there?

Mr. Gray: I don't know whether we will or not.

Mr. Dickson: Almost impossible to cross-examine without a cross section.

Mr. Gray:

Q. Do you know whether there is such a cross section following the Pyle strand from the point in the 1200 of the Elm Orlu on its—or the 1200 of the Black Rock on its upward course here in the Elm Orlu?

A. There is such a section. That section is the one which passes directly through the Black Rock shaft; and there are other sections; these sections here also show.

Mr. Dickson: I suggest it would save time if you would defer the direct examination on that strand until you get that cross section.

Mr. Gray: Very good.

The Witness: It will be much easier for me to explain it.

Mr. Gray:

Q. Then you may go to the Jersey Blue if you will and I will come back to that.

—. The Jersey Blue vein has a strike northwest and southeast and in that respect conforms to the rest of the mem-
459 bers of the northwest-southeast series of fault veins. In places the strike varies. In places it is more nearly east and west. Perhaps if one can give an average strike one might say that it had a strike of approximately north seventy west, but it is much more nearly east and west than that in some places, and more to the—and less—and has a more northerly strike in other places, so that it varies from point to point quite a little. One of the most important factors about the Jersey Blue vein is that it faults the Rainbow lode. We know that it faults the Rainbow lode for a number of reasons and of course if it does so fault it it is later than the Rainbow lode. We know that it is later for a number of reasons. The first of these is that it faults the Rainbow lode. That faulting we can show better in some places than in others because in some places the workings are obscured by timbering and conditions are not so easy to observe. In other places it shows out very clearly. If the Jersey Blue faults the Rainbow lode and is therefore of later age in one place, and that can be definitely established, in my opinion that establishes a later age for the entire vein, if that is once satisfactorily shown. There are two places in which the faulting of the Rainbow lode the dislocation, displacement of it, are most clear. One of these is in the 702 drift of the Black Rock mine, 700 foot level.

Q. Will you turn to that?

A. The 702 drift of the Black Rock mine follows what we believe to be the Jersey Blue from 701 crosscut in a direction north-
460 west until it enters and dislocates the Rainbow lode. That dislocation is shown in the drift. I was in there a very short time after it was driven, before it was at all timbered. The dislocation is shown by the fact that the end or boundary wall of the Rainbow lode in that case the south end of the wall appears on the south side of the Jersey Blue vein at a point fifteen feet further to the east than the same end appears on the north side of the Jersey Blue vein.

Mr. Dickson: How much?

A. Fifteen feet. The Jersey Blue vein then continues on through the ore until it strikes the northeast strand of the Black Rock fault, which has heavy, thick, tough selvage clay, and there terminates against that fault. That is the place which shows, in my opinion, the faulting of the Rainbow lode by the Jersey Blue better than other places that I have seen.

Q. Can you point out some others?

A. There is one other place in which this faulting shows espe-

cially well. That is on the 450 foot Black Rock at a point 67 feet approximately south of the Black Rock shaft. In crosscut 451 the Jersey Blue vein is encountered. It has been followed by a drift in a northwesterly direction until it encounters the south end or wall of the Rainbow lode. The drift then turns—the turn is not shown on this map—and runs in a southwesterly direction and one can there see the offset of the Rainbow lode on the southwest against the granite on the northeast. One can also see on that drift the
461 Jersey Blue vein meeting and terminating against the Black Rock fault.

Mr. Dickson: Give the extent of displacement there, will you, please?

A. One cannot tell what the total amount of displacement at that point might be because the Jersey Blue terminates against the Black Rock fault, which has removed, probably, in its movement, the other wall of the vein. I don't know how much it is there.

Mr. Gray:

Q. Did you find the Rainbow lode cut off on any of the levels by the Jersey Blue?

A. Yes.

Q. You might give one instance, if you will; I don't care to go into all of them?

A. These two instances that I have mentioned I have picked out as being the clearest instances. The first one especially is where we can see a definite offset and faulting of the Rainbow lode by the Jersey Blue. There are, in addition to that, cases in which the Rainbow comes against the Jersey Blue vein, but the amount of faulting that has taken place I do not know and we haven't got a measure of it because the other wall is not observable.

Q. Will you mention one of those places, Mr. Irving?

A. In Black Rock 1002 drift. In crosscut 1001 at a distance about 140 feet south of the center of the Black Rock shaft the Jersey Blue vein is encountered in the 1001 crosscut. It appears also in the southerly end of the 1002 crosscut and run along the
462 drift together with the Rainbow lode until both encounter the Black Rock fault. This cutting of the large Rainbow ore bodies against the Jersey Blue is usually rather difficult to see because the larger portions of the Rainbow lode are usually stoped, the ground is heavily timbered and it is difficult to make satisfactory observations. We could see it in this place rather better than usual because I was in here at the time this drift was being run or being repaired rather, and the opportunity for observation was a little better than usual.

Now, the next reason we have for believing that the Jersey Blue is of later age than the Rainbow lode is that the banding of the Jersey Blue cuts across the banding of the Rainbow lode. In introducing my discussion, I stated that one of the features of both the Rainbow lode and the Jersey Blue—one of the structural features—is that they were banded, due in my opinion to the position of the

original fractures, and the way in which the replacement came out from one fracture toward the other and from the other in the opposite direction, until the two replacements met and made a solid mass of ore, thus producing a banded structure. Now, that banded structure is a very striking characteristic of both these veins. In the Rainbow lode it is usually unaccompanied by gouge or selvage, but in the Jersey Blue, in addition to the banding we usually find selvage clay on one or both walls. Now, there are a number of places
463 where that shows especially well. The most striking of those—I say a number of places—there is one place where it shows particularly well, and that is in the 1511 crosscut of the Elm Orlu Mine, shown on Plaintiff's Exhibit 23, at a point about 65 feet north of transit point 47, where the Jersey Blue is encountered entirely enclosed within the Rainbow lode. The Rainbow lode itself begins at a point about 13 feet north of transit point 47. The banded structure of the Rainbow lode, after one passes into it along this drift, is at a rather shallow dip toward the north, I will give that exactly; it varies a little, but is from 45 to 50 degrees toward the north. The Jersey Blue on the other hand has a steep dip, which I will give; it is about 87 degrees, very nearly vertical.

By the Court:

Q. Which goes through the other?

A. The Jersey Blue banding goes directly through the Rainbow banding. We find a vein here; we find that it is made up of pink manganese minerals, going right through the banding of the Rainbow lode. That is the clearest case of the intersection of one of those veins by the other that I know of. In addition to the banding of the actual mineral in the vein at that point there is also a selvage clay, or several selvage clays along the lode, which has also the banding of the Rainbow lode.

By Mr. Gray:

Q. Has the Jersey Blue vein been developed below the Rainbow and to the south of the Rainbow after it has entirely passed
464 through the Rainbow on the dip?

A. I have not personally seen, nor have we any of us seen the Jersey Blue after it has cut through the Rainbow lode on the dip, but we are now driving on the 1700 foot level of the Elm Orlu a crosscut which should reach that Jersey Blue after it has passed through the Rainbow lode.

By the Court:

Q. Would that be after this trial is concluded or before?

A. Probably in the next few days. It should strike it at any moment.

By Mr. Gray:

Q. You may proceed.

A. Do you care to have me show you the map of the 1700 at this point?

Q. Yes, you might do that if you will.

A. Plaintiff's Exhibit 26. 1701 crosscut is the crosscut in which we expect to find the Jersey Blue entirely on the south side of the Rainbow lode after having passed through it on the dip. That crosscut was started and pushed as rapidly as possible, but the engine broke down two or three days ago, and we had difficulty running it.

Q. You may proceed with your discussion?

A. The Jersey Blue—I mention this to introduce another reason why we think it is of later age than the Rainbow lode—the Jersey Blue is faulted by the Black Rock fault; I have shown that
465 in a number of places; it is thus divided into two severed segments, one to the northwest of the Black Rock fault, and one to the southeast of the Black Rock fault; it is shown on the surface map. Now, if we take the northwest segment where it is separated and away from the Black Rock fault or any complication introduced by that fault, we find the Jersey Blue vein cutting the Rainbow lode in a stope four floors above the 1400 foot level of the Black Rock mine, not very far from the point in the 1500 crosscut of the Elm Orlu, which I have just described. That stope, I have no map to show it in detail here, but in it we can trace the Jersey Blue partly across the Rainbow lode; I say partly, because the workings do not extend the entire distance across.

Now, there is one other reason why we believe the Jersey Blue to be of later age than the Rainbow lode, and that is because it belongs to the northwest-southeast series or type of fault vein. By its characteristic features, its selvage clays, its persistence along the strike, its relative narrowness, its comparatively new branches, the rarity with which it is faulted, all point to a fault vein age, and correlate it with other faults having that same general trend. Those are the reasons which we assign why we believe the Jersey Blue later in age than the Rainbow lode, and to intersect it and cut through it and not to have any junction with it.

Q. Are there any other of those faults found in this property that you can refer to?

A. The most striking of those is the Deadwood fault vein,
466 so called, which has been spoken of by Mr. Greene in his testimony.

Q. Where is that shown in the ground?

A. That shows on the thousand foot level of the Black Rock, the 1100 Black Rock, the 1200 Black Rock and the 1300 Black Rock, especially well; I can take those maps——

The Court: I remember them, unless there is some special feature that you desire to call attention to.

The Witness: There is no special feature about that vein, except the very striking way in which it faults the Rainbow lode.

Mr. Dickson: I would like to have them take down one of those maps and ask your honor to observe the course of the Deadwood fault, and compare it with the course of the Jersey Blue fault.

The Witness: Plaintiff's Exhibit No. 18. This is the Deadwood Fault, which in a very striking manner faults the Rainbow lode.

The course of the Deadwood Fault there—I think is what Judge Dickson referred to——

Mr. Dickson: I wanted the court to observe the difference, if any, in the strike of the Jersey Blue and the Deadwood fault, that is all. I have no questions to ask about it.

By Mr. Gray:

Q. On the south side of the Black Rock fault there is an evident displacement of the Deadwood to the west, and on the same
467 side of the Blackrock fault a displacement of the Jersey Blue to the east; can you explain that, Mr. Irving?

A. If I can have a piece of paper—(drawing). We will suppose that the blue line represents in plan a perpendicular fault. A vein intersected at an acute angle, having a dip in this direction. Now, when the angle of intersection of a vertical plane or surface and an inclined plane, even though dipping at a steep angle—we will assume 70 degrees here—when the intersection is acute, that way, the trace or appearance of that intersection on the surface of the fault plane will be also inclined at a low angle.

Q. I suppose that the reference is to the surface of the ground?

A. Surface of the ground. At some point here there is a mine level——

Q. Represented by the dotted blue line?

A. Yes, mine level; we will put M-L there. For a dip of 70 degrees—I have a chart here that will tell that at once, a dip of 70 degrees, at an angle say for the purposes of illustration, of 10 degrees difference in strike there, the angle which this trace makes on that plane of the fault will be 25 degrees roughly; I cannot figure it very closely with this, so that we will have an inclination something like that; and the larger this angle is, the steeper that intersection line is going to be. Now, suppose over here we have a fault dipping in the opposite direction——

Q. A vein?

468 A. A vein.

Q. Mark it.

A. It does not matter very much what dip we show,—say 50 degrees,—so that intersection is going to take a direction off so. Now, we will assume a movement along that fault which will bring the wall represented by this cardboard down, say in that direction, so that the direction of the movement is like that.

Q. Represented by the red dotted line?

A. By the red dotted line. When this has been moved down in that way,—we will show that graphically, so, running this corner along that line so as to be sure that we have that line so, and a vein on the near side of the fault appears so—that is a little bit too far—this fault will be in that direction, and this fault will be in that direction.

Q. By the first fault you mean—mark that A.

A. That one A.

Q. And the other one?

A. B. Now, there is a way in which I can very easily state that so that it will be applicable more generally.

The Court: Which way does the Deadwood fault dip?

A. The Deadwood fault on this level dips 58 degrees in that direction.

The Court: What direction?

A. Towards the northeast. I will have to look that up
469 to be sure. (Examines notes.) 77 degrees towards the northeast.

The Court: And your theory is that your block of earth in the center dropped down?

A. Probably. That would explain that.

Q. In other words, Professor, the apparent displacement along a fault of two veins that are faulted by it is determined not only by the dip of those veins that are faulted but also by the angle at which they meet the fault?

A. Exactly so. I can perhaps make this clearer. You see there are all possible directions of movement of the fault on one another; just as long as the movement pursues a path which is more steeply inclined than the traces of those two veins on the fault, the discrepancy of the fault is going to be in opposite direction.

Mr. Gray: Will you mark that.

(Marked plaintiffs' exhibit 34.)

Mr. Gray: I offer that in evidence in connection with the testimony of the witness.

Mr. Dickson: No objection.

The Witness: I have described so far the two series of lodes or faults which appear on the map. There remains to be considered the Blackrock fault. The Blackrock fault has a general northeast strike——

Mr. Dickson: We don't make any controversy about the Blackrock fault being later in age than the Rainbow and the Jersey Blue, both of them.

The Court: Is there any particular feature of it that you
470 can enlighten us on in the light of that admission?

Q. In your judgment is the horizontal displacement along the Rainbow great, along the Blackrock fault?

A. I don't think so; I think it is relatively small; of course when I say that, I speak of horizontal displacement, that is, the displacement that we can observe in a horizontal section.

Q. Is the movement along that fault always in the same direction?

A. I think it is very possible that it may not be; that is to say, when a mass of rock is broken by a fault, the two sides, the walls which form the two sides of the fault, are usually distorted, and with distortion and rumpling and subordinating faulting along minor faults there may be that sort of complication of movement which it would be exceedingly difficult to state, and which would account, or could account, if it were to be accounted for, in the difference of

amount of displacement and direction of displacement, as well as the evidence that I have given there.

Q. That is, by your diagram that you have prepared, exhibit 34?

A. Yes, sir.

Q. Have you prepared a diagram Mr. Irving, which shows the Rainbow lode, the Jersey Blue and the Blackrock fault, so that they may be understood?

A. Yes, sir.

471 Mr. Gray: You might mark this for identifications.

A. Perhaps I might indicate on here where this is.

Q. Yes.

A. In order to try and make our belief about the structure here clear, I have prepared a perspective diagram showing the Blackrock fault, the Rainbow Lode and the Jersey Blue vein, and I selected these co-ordinates to represent the block of ground which shows those several veins and faults. The westerly edge is taken along the line 1300 west, the easterly edge along the line 100 west, the northerly border along the top edge of this map as shown here, and the southerly border along the line 100 south, shown there.

Q. All on exhibit 34?

A. All on exhibit 34. One other point. We are supposed to be looking at this block of ground in a direction from the northwest toward the southeast.

Mr. Gray: Will you mark this map, please?

(Map marked plaintiffs' exhibit 35.)

The Witness: This exhibit 35 is intended to represent a transparent block of ground outlined here with the irregular lines at its top representing the intersection of the sides with the surface; it was constructed to scale, so that it is not a diagram-atic sketch at all. It is actually drawn to scale. Each one of the lines which you see,—or nearly all, except the upper ones,—the lines which you see running in a horizontal direction along the various lodes, are

472 the lines along which those lodes intersect the several levels of the mine. The vertical lines running along the several lodes, represent the lines along which the sections intersect the several lodes. This is the west end of the block, the other end is the east end, or the Black Rock end; this is the Elm Orlu end.

Q. Will you just put a "W" there on the line that represents the west line?

A. That is north, east, west. These are parallel to the sides of the block; in that block I have colored in, in red, the Rainbow Lode, the same as it is colored on the map. The diagram was made before these maps were completed, and I used colors which were not followed, all of them, on the map, so that the green represents the Jersey Blue, not as it does on these maps, the Blackrock fault. The blue represents the Blackrock fault on this diagram. The diagram will show—there is one point I should mention here. There is a northerly strand near the surface of the Blackrock fault,—I mean of the Rainbow Lode, which is not indicated on the diagram. I had

not, when the diagram was made, seen or appreciated the importance of that portion or strand, and I did not put it in; there is that discrepancy between this diagram and the map here. The Blackrock fault, if it is followed upward, is seen entirely severed or separated from the Rainbow Lode on the 1500 foot Elm Orlu level, which forms the bottom of the block; follows up in this direction, comes into the Lode as seen at the surface; it follows along the Lode,
473 sometimes reaching almost to the side, and again running across and striking at the other side, and running along the Lode, finally leaving it and going off toward the south of the Rainbow Lode. The Rainbow lode on the other hand, the top or apex of it, follows through in this way in a north and east direction and then in a north 70 east direction, crossing the side line, which is not shown here, and finally going out of the east end of the block at that point at the surface. The way in which the Lode bears down towards the south is, that its upper portion is shown and then turns and dips toward the north. The same is shown at this edge here. The green shows the Jersey Blue surface coming to and going into the Rainbow Lode. That is another point in which the diagram differs slightly from the outcrop map.

The Court: Just indicate where you are supposed to be looking at that from; the point from which the view is taken?

A. On the map?

The Court: Yes, or in reference to your block, right on that sheet.

A. You are supposed to be looking in this direction; the block is turned with its corner towards you.

Q. Standing on the Jersey Blue claim; in other words, looking southeasterly?

A. Standing on the Jersey Blue claim, looking southeasterly. Standing on that claim there looking in this direction.

474 The Court: From which corner of that block are you supposed to be looking from?

A. You are looking directly at the corner, and it places you here.

The Court: That is the northwest corner?

A. That is the northwest corner; it is turned around, exactly the other way. It is very confusing that way. I could not show the other side of the Rainbow Lode because it is too irregular to show in diagram. I was saying that at this point here there is a slight difference in the outcrop from what is shown here on this map.

Q. That is the outcrop of the Jersey Blue.

A. The outcrop of the Blackrock fault and the Jersey Blue, because the two strands in the Blackrock fault here are projected up to the surface and we don't know what is at the surface there, and I have projected only one, the Jersey Blue going into the Blackrock until it struck the fault here, all of which is conjectural and may or may not be so at the surface; that was done simply to make it conform to observations below. Where the blue is shown in the face of the lode, the Blackrock fault is cut there and forms the north wall of the lode at that point, cuts through on dip, on the Rainbow, along that line, and cuts through here. The Jersey Blue is also shown intersecting and passing through the Rainbow Lode on the

dip. This is drawn—while this is drawn to scale it represents on this portion—for instance where the levels have not reached
475 down to and disclosed the Lode, it represents our idea of what the relations are at that point. The rest of it pretty closely adheres to the actual observations.

Mr. Dickson: Is the green on that intended to represent the Jersey Blue vein?

A. Yes sir.

Mr. Dickson: And what is that other color?

A. The red,—that is a shadow cast by this green vein on the red one; this is also a shadow of the Rainbow; that is a shadow of the block and those are shadows on the far side of this block on the inside wall.

Q. What in your judgment is the fact as to the ore bodies and the stopes which you have followed downward in these various levels being a part of the same vein which is disclosed in the Elm Orlu 500 foot level.

A. You mean from the 500 foot Elm Orlu level down?

Q. Yes, down to the 1500 Elm Orlu.

A. I think there is no question but what the ore belongs to the same Lode and is continuous from the 500 down to the 1500 Elm Orlu.

Mr. Gray: Judge Dickson, with regard to the Pyle strand, is it your desire that I should not examine him until the cross section is here? I will have that here in the morning.

Mr. Dickson: I understand that the witnesses desire it
476 also; that it would not be possible to give intelligent testimony without it.

The Court: I think you had better proceed with the cross-examination.

Cross-examination.

By Mr. Scallon:

Q. Mr. Irving, what sort of a fracture is the Blackrock fracture,—fault.

A. I don't quite understand the question, by what sort of a fracture.

Q. Is it a single fracture or a complex one?

A. In some places it is a single fracture and in other places it is complex.

Q. Will you indicate, if you can, where it is single and where complex?

A. On the surface map?

Q. Well, on the surface *may* if you can.

A. I don't think I can do that on the surface map because the surface map is in so many places projected up from below.

Q. Well, can you show me on some map close to the surface?

A. I think so. I will have to select places that I am familiar with. In the 800 level of the Elm Orlu——

Q. Plaintiff's exhibit 13?

A. Exhibit 13,—the Blackrock fault is divided into a number of strands or surfaces of movement.

Q. That is within the survey lines of the Blackrock as shown on the map.

477 A. Yes, sir; presumably that strand comes over and joins in here; we don't know.

Q. You mean that they have extension east and west, doubtless?

A. I mean simply that generally speaking, the strands of the Blackrock unite again on strike.

Q. Now going to the west or southwest, do you find a multiplicity of strands there or not, southwest through the Elm Orlu.

A. I would have to run through the maps to be able to answer that satisfactorily; I don't remember; I don't carry it in memory.

Q. You cannot say from your recollection?

A. Not very well, no.

The Court: Have you examined these maps before and verified them?

A. Yes we have been over most of them; I have not verified all of them.

Q. What from your study of the ground do you recall now whether or not, going to the west you found a multiplicity of fractures of the Blackrock fault, or connected with it?

A. I should say from recollection, which I could probably verify by going through the maps, that where the Blackrock fault takes the turn toward the northwest, there is——

Mr. Gray: Northeast?

A. —Northeast, takes a turn towards the northeast the tendency is much more for it to be divided into a number of fractures

478 than where it is following a direction so, but it also branches all along its course more or less, almost everywhere where one finds it.

Q. It does branch?

A. Yes, usually, sometimes you find it single.

Q. Now, have you attempted to determine the direction of the throw on that fault?

A. No, not otherwise than as indicated on the sections; the reason that we have not made an effort, more of an effort, to determine the throw,—I say I have not made any effort; I have made numbers of diagrams and sections,—is because I don't believe that it is a thing which can be determined with absolute accuracy; I feel certain that the throw is relatively small so far as horizontal component is concerned; other than that I don't think I can say.

Q. What do you mean by relatively small.

A. I don't believe that the horizontal component is over—well, it is less than one hundred feet, and usually less than 50; that is to say, that the displacement of the Deadwood fault as an indication, that is something of which we feel quite certain; the two portions there are so clearly portions of the same thing, that the throw is relatively small. It is below 50 feet, in one case I believe 22 feet, and in another case I believe 35 feet, and below 50 feet.

Q. Now, are you speaking of the actual motion, or of the apparent displacement.

479 A. I am speaking of the apparent——

Q. Of the vein that you referred to?

A. Of the apparent displacement; that is, a separation of the several portions on the map.

Q. But speaking of the actual movement itself, how is that distinguished, how is that as distinguished from any apparent throw of an intersected vein?

A. I don't know what it is. You mean that if you took the total amount of movement along the fault surface?

Q. Yes?

A. To know what the total movement along that has been?

Q. Yes.

A. I don't know.

Q. Have you attempted to determine it?

A. We have taken all of the observations which we have taken for that purpose; I have had in mind working that out if possible, but I don't know of any way in which it could be done.

Q. Have you ascertained the direction of the movement along the Black Rock fault, the actual direction?

A. No.

Q. Have you attempted to?

A. The only reliable thing—you mean the actual movement?

Q. I mean the actual, yes.

A. I have made an effort to find out what it was; I did not come to any conclusion.

480 Q. Have you studied any other matters of the camp or of the system, of the camp, in an effort to determine that?

A. No, not other than the Badger mine at certain levels and certain levels of the Pilot Butte.

Q. Those are the only places you have been to?

A. Yes.

Q. By the way, with reference to this exhibit 34, what direction did you give the paper there, was it a vertical throw?

A. I don't know that, I don't know just what you mean by "throw." You mean a line on the fault surface which is dotted there, which indicates the direction of movement along that fault surface?

Q. But you had a sheet of paper that you put on that a while ago and you moved it down?

A. Yes.

Q. What direction did you move that paper?

A. I moved it in this direction, so (indicating).

Q. I thought you were moving it vertically. That is why I asked you. Then you intended to show a diagonal downward movement?

A. Yes, sir, that is down on this diagram, yes.

Q. So then, as I understand you, as far as the Black Rock fault is concerned, if you disregard the apparent throw of the Deadwood vein and of the Jersey Blue, you can't tell which way it moved or how far?

481 A. I can't tell that, no. I can't tell how far it moved. Let me explain.

Q. Surely not.

A. (Continuing.) The horizontal component, that is to say the displacement which was affected by the movement on the plane map, I feel pretty certain of on account of these different structures.

Q. That is the apparent movement of these two veins, you mean?

A. I wouldn't say "apparent motion." I would say distance which the veins are separated on the levels where the separate sections are observable.

Q. That is to say the physical distance between the veins as you found them now, between these segments?

A. Yes.

Q. Now, what do you mean by component, horizontal component.

A. I guess I will have to draw a diagram to indicate that. (Here the witness makes a diagram which is marked Plaintiff's Exhibit 36 and admitted in evidence.) This diagram is intended to represent the two walls of a fault. The block on the right hand side, which we can call block "A," being dropped down with reference to block "B." The point "O" or corner which is taken simply for convenience as a point to which to refer the movement, has been moved to a point "O'"; possibly along that path, possibly along a more devious path. Anyway this block has come to rest in the
482 position it occupies with reference to this block, as indicated on this diagram. Now, there is by reason of the movement of O to O', a shifting of this O' point with reference to this line here or what may be called a perfect horizontal component of movement.

Mr. Gray: By "this line here" you will have to give it a designation.

A. This line here will be marked M-N. Now, of course, as a prospective diagram, assume that the line N-F is a horizontal line, also the line which disappears at this point behind the other block, the line NR is a horizontal, this is horizontal and that is horizontal. The whole cause of faulting is a tri-dimensional question and that is to say there is a horizontal movement of this point for a distance JS; another horizontal movement SO'; horizontal component of movement; and a vertical component OJ, all of which you can give names to if you want to, and all of which are components of the motion from here to there; motions from O to O' or the total change in position of that point O to O'. We are considering that the right hand block A has been dropped; but it would be just as correct to assume B had gone up and A had gone down at the same time. Have I answered the question?

Q. Well, now, supposing you don't know which way it has moved; whether it has gone up or down or moved horizontally or diagonally.

The Court: He would be pretty much at sea then.

483 The Witness: I don't quite know what you mean. Supposing I don't know, what then?

Mr. Scallon: Then what?
The Court: What is the question? You are simply making a statement to the witness.

Mr. Scallon:

Q. Now, you say supposing——
The Court: Just "suppose"; then what?
Mr. Scallon: Then what; then how do you establish these points?
A. You mean how do I establish the total amount of motion?
Q. Yes.
A. If I don't know which way it moved?
Q. Yes, or how far?
A. I don't say that I can establish that at all. I simply told you what a component of motion was. I can't explain this; it is one of the most difficult things in geology.
Q. I understood you to speak of the horizontal component as indicating the extent of displacement?
A. Oh, no, you misunderstood me; I had no intention to convey any such impression as that. I simply meant to say that within this whole property the horizontal component was small, was not large; usually less than fifty feet, as seen on any level, and indicated by discrepancies in surrounding portions of the plane in that level.

Q. Then as I understand you, you rely upon the compari-
484 sons as you find them now of the Jersey Blue and of the Deadwood to determine the probable amount of movement. Is that correct?

A. If it was a vital matter to determine the total amount of movement, we would have to go into a greater degree of effort to do it; but in working this thing out I saw how complicated and how nearly impossible it was to do it, so I have not carried out my investigation to any definite end, with that point in view.
Q. Now, will you please refer to your section, beginning with the first one. Have you carried into this section such workings as appear in the plane; are they there on exhibit 27, section 2?
A. The workings which are put in solid are those where the section actually passes through or along, for instance a drift, where the section runs along one side of it would appear in the section, and the ones which are dotted are those which are projected.
Q. But generally speaking you have carried into that all the workings that were in the plane or close to it?
A. Yes; that is I did not make these sections but I presume that is what was done.
Q. What is there to indicate that sharp termination of the Elm Orlu vein between the ten and eleven hundred levels of the Elm Orlu?
A. I can't answer that question without looking at my notes.

Q. At the shaft there?
485 A. That sharp termination is because in making the section No. 2 of the 1000 foot level of the Elm Orlu, the ore extended near it—that is in this dotted drift here near the section

completely from the Black Rock fault to the point which is indicated as the northern boundary, while on the next level, the 1100 Elm Orlu, ore was not found in the nearest workings to this interval between the drifts 1104 and 1127, and consequently it was not indicated there in the section. How it ends in between there I don't know; it may be there; it may come down over that level, but there are no workings at that point, so I cannot say.

Q. Can you tell me how far the nearest workings are from that plane?

A. On the 1100?

Q. Yes, at the point you mentioned there on the 1100?

A. From the shaft on Section 2, taking the center of the shaft, it is about 22 feet. The shaft is projected on this section. The drift that is shown here runs out in a northwesterly direction until it has reached a point at the shaft, so that it is gradually getting further away. Then it bends due north, and due north it is at a distance of 55 or 56 feet from the center of the shaft to the section here.

Q. Now, you have some red shown here south of the shaft, haven't you?

—. Yes.

486 Q. On the 1100 and the 1200. Do you consider that a part of the Elm Orlu?

A. This small vein that you see there is a one foot vein with manganese and quartz in it, and I don't know whether it is part of the Elm Orlu or not.

Q. That is marked 1127?

A. Yes.

Q. Well, what about 1202?

A. I don't know what that ore is, whether that is part of the Rainbow lode or not; it very likely may be.

Q. Then do I understand you to mean that the Rainbow lode may continue downward along right in the neighborhood of the green line marked on this map?

A. Well, I did not say quite that; I said that it might extend down, for all I knew, below the 1100 level, because there was a place where we did not have information, and I would have to look at my notes to see whether it could possibly extend below the 1200 level or not—I do not know anything about how it is on the 1200 foot level, because there are no workings other than those right here in the immediate vicinity of the shaft.

Q. That is a drift shown there, I suppose, is it?

A. Yes. But to say what there is on this section of the 1200 level—we have no workings here at all. This is drawn across there because we suppose it to be there.

Q. Well, will you take the next one then?

487 A. Section No. 3, Exhibit 28.

Q. Is that green line intended to indicate a wall of the vein, or merely the Black Rock fault?

A. It is intended to indicate the Black Rock fault, which at that point happens to be the wall of the vein.

Q. The south wall of the vein?

A. The south wall of the vein.

Q. Now, how about the extension of the vein down there along that Black Rock fault or in its neighborhood?

A. Now, on the 1200 at that point there in the drift 1202—that is a drift run in a due easterly direction, in which granite is shown on the south wall, and the Black Rock fault on the north wall, and nothing is known as to what may be over here to the north; there are no workings there.

Q. How about the next section, section 4, exhibit 29, in that respect?

A. I don't quite understand what you mean me to take up there. On the same level I have indicated a break in the ore, there is no ore there?

Q. Well, explain that?

A. Well, 1202, in the south edge of the vein, as indicated on Exhibit 29, there are no workings in that immediate vicinity. This portion of this ore has been projected from the dotted drift onto the level, and here I don't know for certain that that ore is there; that is to say, that the southern portion of that ore is there.

488 Q. Now, on this section 4, Exhibit 29, what is that working from the 1303 Elm Orlu to the 1200 Elm Orlu in the vein here?

A. That is a raise which I have not been up, and which I do not know anything personally about.

Q. I notice starting from that raise a broken line extending down to the next level or opposite; what is that intended to indicate?

A. That is intended to indicate a fault. I think that is colored violet. Yes; you will notice that it is, and this also is colored violet. Violet indicates that we do not make any pretense of determining whether these belong to one or the other fault systems.

Q. It is some kind of a fault, however?

A. Yes. I will refer to my notes. There is a vein cut by section 4, dipping very steeply toward the south, where it runs down to the edge of this drift, that is bordered by a northwest fault, presumably that fault that we see there, but my notes show it too far from the section to be put on there, and I don't know whether the notes of the other geologists are different from mine on that point or not.

Q. What color do you call this?

A. That is violet.

Q. Now, what does the violet lines on the north side of the vein indicate?

A. That indicates the fact that at the nearest point where that north wall of the lode was seen, there was a gouge along that wall which has been projected over from the west.

489 Q. On this heavy red line which I now show you, has that any significance, which goes down from the 700 Elm Orlu?

A. That is simply meant to indicate the outlines of the ore body where we feel more certain what it is. Where they are dotted we are less certain of it.

Q. How wide is the Elm Orlu vein in this section at its narrowest point—or say at the 500 Elm Orlu level there?

A. About 22 feet.

Q. And how wide is it down below one of the wider portions, say on the 1100?

A. About 136 feet.

Q. Now, at that place is it composed of a number of strands, or is it single?

Mr. Gray: That is upon the line of this particular section?

Mr. Scalon: Yes, sir.

A. Practically single in there; in some places—some of this ore through here from the dotted section—to here—there is a stope in here, and that was practically all solid ore. As far as my observations go there is a drift right near there which goes through which shows mineral matter all the way across here.

Q. Are they still stoping there?

A. That I don't know.

Q. How is it on the level below the 1200; what is the width there and what is its character?

A. The width is indicated on this section as 138 feet, but
490 as I remarked before, a portion of that ore through which this dotted line extends is projected onto that section from nearby, and we don't know whether it extends quite that far or not.

Whereupon further hearing was adjourned until October 21, 10 o'clock a. m.

Thursday, October 21st, 1915—10 o'clock a. m.

Trial resumed pursuant to adjournment.

JOHN D. IRVING, recalled, testified as follows:

Direct examination (resumed).

By Mr. Gray:

Q. Mr. Irving, will you take the sections which have now been presented——

The Court: Are you prepared to complete the direct examination of this witness? I do not think it is wise to examine a witness piecemeal; it is better to complete the examination at one time.

Mr. Gray: Yes, sir, I will take up the matter that was left open yesterday. I am going into the matter of the Pyle strand and one other matter, and that is all.

The Court: Proceed.

Q. Will you take the sections which have now been presented and trace the Pyle strand connection, and give us your opinion as to what you call the Pyle strand of the Rainbow?

A. The Pyle strand of the Rainbow—perhaps before I show the sections I had better explain what it is: The Pyle strand of

491 the Rainbow is a branch or fork or strand which branches off from the Rainbow lode on the south side in the Elm Orlu claim, and extends in an easterly direction as far as the east end line of the Elm Orlu claim or very close to the east end line; a few feet from it. It unites, however, or is believed to unite with the Rainbow lode on dip, so that we have a junction—what we believe to be a junction of the Pyle strand and the Rainbow lode on dip over in the easterly portion of its course, and a union or junction with the Rainbow lode on strike in the westerly portion of its course where it unites with the Rainbow lode. Now, I can take the Pyle strand and show its beginning on the west by a section which passes through the Black Rock shaft, which I will indicate here on the plan map. The section goes directly through the Black Rock shaft, running north and south, parallel to the co-ordinate line No. 200, but to the east of it, through the center of the shaft. I will begin with that section, and then take successively the sections which lie to the west of that until I have shown its junction on strike with the Rainbow lode.

(Sections numbered 9 to 16 marked Plaintiff's Exhibits Nos. 37 to 44, inclusive.)

Mr. Gray: The exhibit may be introduced and received in evidence, Mr. Dickson?

Mr. Dickson: Yes, sir.

Whereupon the exhibits previously marked were admitted in evidence.

492 Mr. Gray: Proceed, professor, with the question that I asked you.

A. In starting to show the sections which illustrate the Pyle vein I stated that we would begin with the section that went directly through the Black Rock shaft. I find that I should have taken a section which lays east of the Black Rock shaft along a line 100 feet west of the zero point.

Taking that section first we see that the Rainbow lode is a broad lode and that there is no separate Pyle strand below the Black Rock 1100 or a short distance below that point. From the 1200 Black Rock up to the 1100 Black Rock and then to the 1000 Black Rock to a raise or a stope with a raise at the top extending upward, or what Senator Clark has testified extended upward on a strong vein or lode. At the Black Rock 1100 that shows in a drift. At the Black Rock 1000 we also find it. From the Black Rock 1000 upward it has been followed in a raise so I am told, though I have not been in that portion of the raise myself—up to the Black Rock 700. From the Black Rock 700 I have been up to the top of the raise indicated here, which is dotted because it is a short distance to the west of the section line. And I was able to follow the vein in the raise for 26 floors from the Black Rock 700 level. Above that the raise was badly lagged and I was unable to observe and I do not know whether the Pyle strand continues further up than that or not. You

will see clearly here the junction on the dip, but it must be
493 remembered that the Jersey Blue vein probably cuts across the Pyle vein and intrudes itself between the Rainbow lode and the Pyle vein inasmuch as we believe the Pyle strand to be a part of the Rainbow lode. The other features of this section are not pertinent to the discussion of the Pyle, other than the fact that the Rainbow lode at the point where the Pyle strand joins it and below and also above the 1200 foot level of the Black Rock is a very broad and extensively stoped ore vein.

The Court: Have you seen the junction of the Pyle strand and the Rainbow at that point?

A. I have not. That raise has not been accessible for a great many years I believe.

Q. These cross sections that you are producing, in their entirety do they represent your own observation—apparently not?

A. They do not entirely so. They represent very largely my own observations, but there are places where the veins or lodes are inaccessible, and I will say that there are one or two places, such as the portion of this raise, which I have not visited.

Mr. Gray: Your honor will remember Senator Clark and Mr. Pyle were the only men we produced here who saw the raise.

The next section, Exhibit 41, is the section which goes directly through the Black Rock shaft. On that section we again show the
494 Pyle strand of the Rainbow, which is found in the 1100 Black Rock in the 1141 drift, and above that it is cut in levels which are not exactly on the section line, and extends upward to probably the 450 foot level of the Black Rock mine, or the 450 crosscut to the south.

In the next section, Exhibit 40, which is along a line 300 feet west of the zero point of the survey, we find the Pyle strand of the Rainbow in the 1100 foot level of the Black Rock and in the 800 foot level of the Black Rock also. Between those points at this section it has been connected through by inference, and has not been actually observed but on those two levels it is a very strong vein, and on the 800 foot level it has been drifted on in an easterly direction to within a few feet of the east end line of the Elm Orlu claim. We have also drifted westward on it on the 800 foot level.

The next section, Exhibit 39, which is 100 feet west of the last and 400 feet west of the zero point of the survey, the Pyle strand of the Rainbow is not shown. Now, those are the sections which will show the connection or junction of the Pyle strand of the Rainbow on dip.

Q. In your judgment, Mr. Irving, is the Pyle strand a part of the Rainbow lode?

A. I think it is.

Q. And your reasons?

A. My reasons for thinking the Pyle strand is a portion of the Rainbow lode are, first, that it has the same general physical features as the Rainbow lode. It is apparently not a very regular

495 vein; it shows replacement boundaries quite frequently; widens out and narrows irregularly; it unites with it on strike in the Elm Orlu ground, and has all of the features which appear to me typical of the Rainbow lode as distinguished from the fault vein type.

Q. If two strands, such as the main strand of the Rainbow and the Pyle strand, unite on strike, what is the fact as to their uniting on dip where they are not vertical?

A. If they are not vertical—that is, if they unite on strike?

Q. Will they unite on dip?

A. Well, they must unite on dip in that portion of the territory where they unite on strike. If they diverge, it would be a question that will depend upon the dips of the two.

Q. In your judgment is the Pyle strand continuous as it is developed from near the 450 foot level down to the large stopes on the 1200?

A. I believe it to be without question, but I have not seen that raise described by Senator Clark.

Q. Where is the top of this Pyle strand as you have observed it; beneath the surface of what claim?

A. The top of the Pyle strand, as far upward as I have been able to observe it, is entirely within the Elm Orlu claim.

Q. Where can you see the Pyle strand united on strike with the main strand of the Rainbow?

A. That can be seen on the 1200 foot level of the Elm
496 Orlu and on the 900 foot level of the Elm Orlu.

Q. Will you just point to those two places?

A. On the 1200 foot level of the Elm Orlu in drift 1204 the Pyle strand has been stoped and may be followed westward along 1204 to its junction with the Rainbow lode. It is separate from that at that point by the Black Rock fault. The drift on the Black Rock 1100 is shown running eastward on the Pyle strand. I have been on that drift just recently, last Monday, and observed it, and also the lode in the east end of 1232. It is our intention and we have been working to connect these through. These two levels here, the drift, the 1232 and the 1106, are not on the same level. 1106 is about forty some odd feet below the 1232. The raise here at the end of 1106 has been driven upward and I imagine that they have since connected through with the top of that raise.

Q. Where was the other one?

A. The other one was the 900 Elm Orlu. The—in the 900 Elm Orlu, drift 908 is running easterly here, southeasterly, on what we believe to be the Pyle strand of the Rainbow, which we believe will connect up with the Pyle strand as shown on the 1804 drift of the Black Rock mine which is about forty some odd feet below the 908 drift of the Elm Orlu. Connection has not on this level been made.

Q. On the other section you said something of the Pyle strand being separated from the main Rainbow by the Black Rock fault. What do you mean by that?

497 A. I meant that the Black Rock fault in faulting the Rainbow lode, than which it is later, would naturally fault any branch of it that it happened to pass through, such as the Pyle strand.

Q. I believe you have already stated that in your judgment the Black Rock fault was later than the Rainbow?

The Court: I think that is agreed upon.

Mr. Gray:

Q. Is the condition which you found where the Pyle strand united with the Rainbow on the 1,200 Elm Orlu similar to the condition which you found on the 1,000 foot Black Rock, just east of the Deadwood fault? The Black Rock cutting the Rainbow—do you understand the question?

A. As I understand the question you mean is the condition in the Elm Orlu level where the Black Rock cuts the Pyle strand the same?

Q. Yes, sir.

A. I think it is exactly similar, yes.

Q. Have you determined the point on the common line of the Black Rock and Elm Orlu where the main strand of the Rainbow lode at or near the surface—at the surface—crosses that line with reference to the southwest corner of the Black Rock?

A. I have observed the Rainbow lode in the trench "E." I have not measured on the surface the position of the south wall of the lode from the southwest corner of the Black Rock claim. I have, however, measured the distance of the south wall from the east end
498 of the trench "E," and I was able to trace mineralized material to a point sixteen feet west of the east end of trench "E." Then I have carried—that, if carried along the strike would bring the south wall across the south side line of the Black Rock at a point about ten feet west of the east end of the trench.

Q. West of the east end of the trench?

A. Yes; that would be on the side line.

Q. That would be how far from the southwest corner of the Black Rock?

A. That point, on scaling it off on the map, is 314 feet east of the southwest corner of the Black Rock claim measured along the claim line.

Q. What is the character of this material that you found upon the point sixteen feet west of the east end of trench "E" and how do you identify it as part of a vein?

A. At a point 53 feet west of the east end of trench "E" the south wall of a strong quartz seam is presented about five feet in width. From that point eastward to a point which I have mentioned, 16 feet west of the east end of trench "E," the country rock is full of seams and streaks of iron and manganese oxidized. The iron I think without question is the result of the oxidization of pyrite minerals and the manganese from some rhodocrosite or rhodonite minerals, both of which are minerals deposited at the time of the mineralization of the Rainbow lode and oxidized. Beyond that the granite has an
499 unaltered appearance and contains no evidence of mineralization, according to my observation.

Q. Turning to exhibit 25, the 1,500 foot level of the Elm Orlu, as it develops what you term the Rainbow lode, both on the surface of the Jersey Blue vein and also the Admiral Dewey, I believe it is, in your judgment what is the fact as to this being part of the Rainbow lode which you are describing as apexing within the Elm Orlu?

A. I think there is no question but what that is a portion of the Rainbow lode.

Q. And what is the fact as to its being developed from there upward with such continuity as would permit you to identify it?

A. Raises have been put up in the Rainbow lode, upward from the 1,500 foot level—not all immediately over one another—the bottom of one not far from the top of the other, continuously upward to the 500 foot level.

Cross-examination (resumed).

By Mr. Scallon:

Q. Mr. Irving, will you please point out there on a section or a plan map the highest point where you saw the Pyle strand?

A. You mean the highest point in the eastern end?

Q. Anywhere?

A. Exhibit 42. In the raise which extends upward from the 700 foot level of the Black Rock, the Pyle strand I was able to
500 follow definitely up 26 floors. As far as I know that is the highest point at which I have personally been able to recognize that lode.

Q. Will you indicate on the map where that would bring you, the top of the 26th floor?

A. I am not sure what the length of those timbers is; I think it is seven feet.

Q. It is something over seven feet according to my information.

Mr. Gray: Mr. Bruce says they are seven feet two and a half inches; seven feet ten inches from center to center.

Q. I have marked on the section with a pencil the highest point at which I was able to observe any mineralization in the raise. The raise is of course dotted here, as it is not exactly on the section line.

Q. Will you please put your initials, if I may have leave to mark it; it is on Section 14, Exhibit 42. You have marked that line with your initials there, J. D. I.?

A. Yes, sir.

Q. To what part of the raise does that mark correspond?

A. I do not quite get your question. The highest point at which I made that observation was in the raise itself.

Q. How close to the 500 foot level of the Elm Orlu is that?

The Court: Perhaps he can give the number of feet above the 700. Is that the 700 Black Rock?

Mr. Scallon: Yes, the 700 Black Rock.

501 A. I can give you the distance up if you wish; I just figured it out a minute ago. It is 184 feet above the 700 foot level.

Q. Have you indicated on any of these cross sections the 500 foot level of the Elm Orlu in the vicinity of that raise, from the 700 Black Rock?

A. I am not sure; I will have to look and see. It is not on section Exhibit 41, but the 500 Elm Orlu appears on Exhibit 40.

Q. How many feet below elevation 5,700?

A. About 18 feet.

Q. Now please get out the other one, Exhibit 42. Now, the line marked "J. D. I." on Exhibit 42 is how many feet below that elevation 5,700?

A. 179 feet.

By the Court:

Q. What is the scale of those sections?

A. 40 feet to the inch.

By Mr. Scallon:

Q. At that point you show the Pyle strand north of the raise, don't you, if I understand it?

A. I did not see it—I did not know it was north of the raise. I saw it in the raise.

Q. That is merely the projection, then, which gives it that appearance?

A. I did not make this particular section or put the color on here, so I do not know what the reason was for putting that off there. I saw the mineralization on the 26th floor in the raise. Pre-
502 sumably the projection may have brought it out there. I don't know why that was put there to one side. I saw it in the raise.

Q. Now, did you try to find it above that point?

A. I did.

Q. Where did you look for it?

A. I looked for it in the raise as far as I could see.

Q. Well, what prevented you from seeing it, the lagging, do you say, or what?

A. The lagging of the raise. I could not see the walls except a little bit here and there; I could not tell.

Q. When did you make your examination of that raise?

A. In the latter part of September; I cannot remember the exact date.

Q. Of this year?

A. Of this year.

Q. How many times were you in it?

A. Once.

Q. Were you here while the raise was going up?

A. I was not.

Q. Did you make any examination of the 500 of the Elm Orlu with a view to tracing it above that?

A. I did.

Q. What did you find up there?

A. I found some small irregular veins which may be a continuation of the Pyle, and they may not; I don't know.

503 Q. Then, if I understand you, Mr. Irving, when you say that the top, as you observed it, was in here, you mean the highest point that you observed it?

A. I mean the highest point to which I was satisfied that I could follow the Pyle strand to recognize it as such definitely.

Q. But as far as you know, it may continue upward, of course?

A. It may.

Q. And you cannot say where in its upward continuation it will go?

A. I don't know.

Q. Now, coming back to the other sections where you left off last evening, Professor, take Section 7, Exhibit 32. There are places on that section where the Elm Orlu vein appears to be very narrow, aren't there?

A. Take the 500 foot level, for instance,—did you ask me a question then? You say it appeared in places——

Q. Yes.

The Court: What is the question; you simply stated to him that there were narrow places.

Q. I asked if that is correct, of course; that is the question?

A. Yes, sir; it is rather narrow in places on this section.

Q. So it is really narrow there; it is not merely due to the projection of the workings to the plane of this section?

504 A. In answering that question I will have to say this, that the Rainbow lode on the 500 foot level there, where it is shown narrow, is shown along a drift, a rather long drift, and at the point where the section goes through there is no cross cut to the north or south to determine how wide the vein is at that point; but we know that there is that much of it there. Whether there is more I don't know.

Q. Well, there is a crosscut here on the 800 Elm Orlu, projected on here?

A. Yes.

Q. Does that give you a more definite indication as to the width?

A. It gives a more definite indication of the width of the lode in there, but the country is somewhat mineralized to the north of the section line where it passes through the section here.

Q. But in this region, say from the 500 down some distance, it is comparatively quite narrow?

A. It is narrower than it is at some other places.

Q. Do you know of a raise put up from the 1500 of the Elm Orlu in the southern portion of this showing of the Elm Orlu vein?

A. On this section line?

Q. Well, either on Section 7 or 8?

A. There are raises in here, but I am not sure that I can state off hand where they are. There are raises shown on Section 8.

Q. No, I mean a raise from the 1500 Elm Orlu?

505 Mr. Gray: Couldn't you indicate about the point where it starts up?

Mr. Scallon: Well, I am not sure that it is indicated on these cross sections. That is why I was asking him to point it out. If you gentlemen will kindly point it——

Mr. Gray: Here is the 1500 Elm Orlu plan map; perhaps you can identify it there.

Mr. Gray:

Q. Do you mean the 1509 crosscut?

Mr. Scallon: Yes.

A. Yes, I know there is a raise there.

Q. Extends how far up?

A. I don't know; I haven't been in it.

Q. Can you tell me where would that fit on the two sections?

A. They were starting on that raise the last time I was in that crosscut.

Q. How long ago?

A. I am not sure that I can state definite, but it was either the latter part of September, a few weeks ago, or it was since I came back to Butte last week.

Q. Can you tell me on which of these sections that would fit?

A. That should be on section 7.

Q. Whereabouts on the section?

A. In the first place, in order to get that raise on that section it would need to be projected for a distance of 60 feet towards the west.

Q. Well, it would be nearer the other section?

506 A. No, that is the section to which it is closest.

The Court: Do you mean it would appear sixty feet from the background of this section 7?

A. It would be sixty feet in the background of this section 7.

Mr. Scallon: Well, that would bring it between this section and the next one, of course?

A. Bring it between those two sections, between this section and the next section towards the east.

Q. And you say you have not been in that at all?

A. I have not been in that raise.

Q. Did you superintend the making of these cross sections?

A. I did not do so, no. I made a series of cross sections myself from No. 2 to No. 8, and then these cross sections were gone over with the cross sections made by the other geologists carefully to make comparisons and verifications and the final results of our conclusions were placed upon these maps. Some places where I had not been the data secured by the other men appear on the section and I know less about that.

Q. But you did not undertake then, if I understand you, to supervise the final preparation of these?

A. I did not.

Q. Take section 8. Will you please refer to your notes and tell me what you observed on the 1400 foot level of the Black Rock and above the place indicated on this cross section.

A. At the exact point where that section passed through
507 the 1400 Black Rock I saw that there had been a stope but I could see no ore, other than the north boundary here. If you care to have me state what I saw towards the east of that section——

Q. Well, did you go into that stope at that point?

A. I did not.

Q. Were you able to make any observations of the level as to the wall?

A. At the exact point where this section passes through?

Q. Did you make some observation there; did you?

A. I didn't make any geological observation at the exact point of that section, no.

Q. Well, how far east or west from there?

A. A little ways—just about the center of the drift as indicated here and about fifty feet toward the west, that is to say beyond the section as we look at it, I could see up into the roof of the stope and there could see that there was ore in the roof.

Q. Did you observe any gouges there on one side or the other of the ore body?

A. Not at the immediate point where the section passes through, no.

Q. Well, did you observe it west of there?

A. East of there I did.

Q. How far east?

A. East of there a distance of 36 feet on the south end of the stope drift as shown here and near 1410 crosscut I found the
508 Jersey Blue vein which was projected westward at that point.

Q. But tell me what you found in the shape of gouge?

A. Gouge east of what was probably the Jersey Blue.

Q. What was the dip of the gouge?

A. The dip of the gouge was very steeply towards the north at that point, almost vertical.

Q. Did you observe in that vicinity any gouge on top of the ore body which would be likely near the hangings?

A. You mean the hanging wall?

Q. Yes.

A. I did not at the point where the section goes through observe any hanging wall gouge nor anywhere in that neighborhood.

Q. Did you observe it anywhere?

A. Anywhere on that level?

Q. In that neighborhood I say, going back towards the next section, section 7, or at section 7, what would be exhibit 32?

A. No, I have a note here "couldn't see the contract"—marked on the western wall. There was a crosscut that is about 150 feet west of this section in which I endeavored to observe such a gouge but I dotted it across there because I couldn't see the actual contact. I have no notes as to why I couldn't see it; I don't remember.

509 Q. Now, at section 7, how far up is the stope, do you judge that point above the 1400 foot?

A. Well, I visited a stope above the fourteen hundred foot level of

the Black Rock and went up four floors into that stope. I can't tell you at just what point I went up into that stope without having a map of the stope before me, but I went up into the stope somewhere not very far—probably not very far from where this section goes through, but it may be—may have been as much as 50 or 60 feet—I don't know without the maps here, and then I went westward in that stope but I can't tell you exactly where that stope is.

Q. What observation did you make there in the roof of the stope?

A. In the roof of the stope when I visited it—I can show that stope, incidentally. I see it is on the map here. That stope is indicated here.

Mr. Gray: That is exhibit 23?

A. Exhibit 23. Now, the section we were looking at was section 8. You will see where section 8 goes through there, 700 feet west. Section 8 would go through about in here (indicating on exhibit 23). As I say—saying it without the map, I couldn't tell where the stope was here, and section 8 is on the line 700 feet west, just half way between these two points, right in here (indicating on exhibit 23).

Q. Well, there is—is there any stope shown on the plane map?

510 A. No. That stope I was speaking of, into which I went to the fourth floor above the fourteen hundred foot is indicated here and is much further to the east than we were with section 8.

Q. That is a stope situated between the Black Rock shaft and extending a little distance west to crosscut 1511 on the map?

A. Yes.

Q. That would not be in the same neighborhood at all?

A. No. I couldn't tell without the map before me.

Q. These are all the observations you made, do I understand you in the neighborhood of that section, section 8?

A. Those are all the observations I have made—one moment please—in the immediate neighborhood of this section I noticed some fifty feet to the east that there was a small sheet of ore in the Rainbow lode there.

Q. I was asking particularly about gouges?

A. These are all the observations I have made on gouges with the exception of some observations made on a crosscut which runs south and lays about forty feet to the east of the section.

Q. By the way, speaking about gouges. I believe you testified about gouges in the Jersey Blue, did you not? In what way do they resemble or differ from the gouge of the Black Rock fault?

A. I don't think they differ from it in any important par

511 ticular. In places the gouge along the Jersey Blue has been displaced by mineral matter which, as the Black Rock fault is not mineralized, you cannot observe along the Black Rock fault—at least I have never observed any indication of mineralization that amounted to anything on the Black Rock fault. In fact, personally I have never observed any at all. There is that distinction. Other than that, which is trivial, I don't know as I can make any di

tinction in the character of the gouge. Jersey Blue gouges are usually a little narrower.

Q. Do I understand you to say that in some places the gouge in the Jersey Blue has been replaced by mineralization?

A. Occasionally it has.

Q. What makes up these gouges, where it is thick enough for you to examine it?

A. That is rather a difficult question to answer. I can tell you the things which generally make up the gouges.

Q. I mean as far as you can observe in this case?

A. It is a clay.

Q. I am not asking you for the chemistry of it at all or the technical contents, but the physical appearance.

A. It is a bluish gray—sometimes a bluish gray clay usually laminated parallel to the surface of the lode along which you find it, and in many places it becomes very dark and almost black in its
512 appearance. That is practically about the same along the Jersey Blue vein, you will find it making a very sharp contrast in color with the granite through which it passes, being almost dark in appearance at places.

Q. Does that gouge include some broken rock or things of that kind, broken material?

A. In the Black Rock fault it does; you will find sometimes where the gouge is quite wide; you will find it sometimes as much as ten or twelve inches, and if you pick into it, you find embedded in this tough clay fragments of broken ore and rock material.

Q. And those fragments indicate what?

A. They indicate that they have been dragged in there during the time that that fault was formed.

Q. Have you observed carefully the gouge in the Jersey Blue to determine whether anything of that kind occurred in it?

A. In a good many places I have observed the gouge in the Jersey Blue; in a very large number of places, in fact, and I don't remember having seen any fragments of ore embedded in the gouge along the Jersey Blue.

Q. At what points have you examined; are you able to state them from memory?

A. I can give you a statement of some of them, yes.

Q. Just a few. When you examined the gouge of the Jersey Blue?

A. In 1115 crosscut of the Elm Orlu on the 1100 foot level
513 where the Jersey Blue crosses, I examined the gouge.

Q. Will you indicate on one of these plan maps?

A. Exhibit 17. This is the 1115 drift. It is not so marked here, but that *it is*.

Q. Yes, that is it?

A. I observed the gouge on the north wall of the Jersey Blue at that point.

Q. And what do you note there about it?

A. Very strong, six inches of leather. Leather is my term for that gougy clay.

Q. Tough clay?
A. Tough clay.
Q. Can you indicate any other point?
A. Yes. In 1117 drift on the north wall of the Jersey Blue, as there indicated, I observed the gouge.
Q. And what did you observe?
A. A narrow black clay seam.
Q. Now, are those all the observations regarding the gouges in the Jersey Blue that you made in those crosscuts?
A. In these two crosscuts these are the only ones I have notes of. I have put down in my note book in blue pencil those gouges and others, but I have no notes describing them.
Q. Have you any notes regarding the appearances of the gouge on the 450 foot Jersey Blue?
A. Yes, I think so. In the 450 Black Rock, you mean?
514 Q. Yes.
A. Referring to Exhibit 11. When this crosscut 451 was first driven——
Q. Well, we won't mind that for the present; I wanted over on the west here.
A. I beg your pardon. That is the 400 Black Rock over there.
Q. Well, that is all right?
A. Well, I have no notes describing the gouge here; I have a blue gouge indicated, and I remember this gouge up here, and it was quite strong, and in 412 there was a very considerable gouge at that point on the south wall of the Jersey Blue. The drift when I was in it was caved so that I could not see the full thickness of the Jersey Blue, and if there was a gouge on the foot wall I don't know; I did not see it.
Q. Did you observe it in crosscut 406?
A. I observed a gouge there, but I have no notes of the character and general appearance.
Q. Do you remember about it, which wall it was on?
A. I have marked it here on the north wall.
Q. Can you get the 450?
A. The 450 level is platted on this same plan map of the 400 Black Rock level.
Q. Exhibit 23. In referring to the plan map in connection with Section 8 a while ago, I believe you referred to the 1500 of the Elm Orlu?
A. Yes.
515 Q. Wasn't it better to refer to the 1400 of the Black Rock, because that point on the section was on the 1400 Black Rock?
A. Which point do you refer to?
Q. At the crossing of the drift?
A. Oh, I understand; this point here. I went out into the stope, but I don't think you will find that stope platted there, the stope floor may be.
Q. On the 1400 Black Rock?
A. I have the notes in my note book of that stope.
Q. Exhibit 24. I am afraid the reference to the 1500 here would

give a false impression as to the facts, and that is why I make the suggestion. You said there were no stopes showing on the plan map at the point indicated. This is the 1400 of the Black Rock. Now, will you get out section 8, if you please?

A. Here it is; Exhibit 33.

Q. This being upon the 1400 drift of the Black Rock?

A. Yes, on Section 8.

Q. Now, on this plan, what do you find there in the shape of stopes on the plan map, on Exhibit 24, being the 1400 foot level of the Black Rock claim, where Section 8 crosses it?

A. Where Section 8 crosses the 1400 foot level, which is 700 feet west—that would be in here.

Q. There are stopes over there?

A. There are stopes, and I would like to explain, if I may.

516 Q. Certainly, that is the reason I ask you the question.

A. When I said there were no stopes there I meant simply that they were not indicated in my note book.

Q. Or on the plan map to which you referred?

A. On that other plan map, the 1500.

Q. Now to correct that, I will ask you if there are stopes indicated on this map?

A. Yes, there are stopes indicated there.

Q. Which would be above that point in the plane of section?

A. Presumably, yes; undoubtedly.

Q. Now, what did you observe there in the back of the stope?

A. Right on the section?

Q. Yes, or in that neighborhood, you know?

A. Well, in that neighborhood I saw a back of ore through a hole in the timbers; it evidently had not been stoped directly over the level at that point, which is still observable I presume. I don't know when this stoping was done, but certainly at the point which I described there, approximately 15 feet west of Section 8 a small hole in the timber—I climbed up over the timber at that point and looked at the back, and there was some ore in the back there; there must have been a stope up there, but I don't know.

Q. What you saw was ore up in the stope there?

A. Yes, and there was a little clay seam in it.

Q. Have you any mention of the clay seam?

517 A. Yes, I have "Clay fault shows in Roof."

Q. Dipping how?

A. I did not determine the dip. I looked up some ten or 15 feet; I could not tell exactly, and I could see the roof with zinc ore and a little clay seam in it.

Q. Now, generally speaking, have you found any merchantable ore in the Jersey Blue as indicated by these maps, east, or southeast, if you prefer so to call it, of the Black Rock fault?

A. We have not sampled those sections or segments of the Jersey Blue southeast of the Black Rock fault, so I could not say whether there was merchantable ore there or not.

Q. Well, where you have observed, can you tell me whether there was anything that you would call ore there from a visual inspection?

A. There certainly is quartz and mineral material there. Now, to answer the other question——

Q. Is there anything there that you would stope if you were mining?

A. I cannot answer that question without looking through my notes, but I could say offhand that I don't remember having seen a place to the southeast—or in the southeast segment where the ore was both apparently rich enough in zinc and wide enough to be worth while stoping; but that is a characteristic that repeats itself along the Jersey Blue vein, as well as these other fault veins, constantly, and can be many times duplicated between chutes.

518 Q. But you did not find anything there of that kind, did you?

A. Well, I have not sampled it; there may be places where the quartz—where the lode carries material which might be valuable, I don't know; I did not see any that I would have so considered, though.

Q. No, you did not see it, that is all?

A. No.

Q. Now, isn't it a fact that in these portions of the so-called Jersey Blue vein you have some clay and occasionally some quartz or a little red manganese, and that is all?

A. No, I would not say that, because I would have to go to each place in the south segment and look at my notes carefully to see.

Q. Well, generally speaking, would that be a fair description of these seams, of the filling of the fissures indicated there as the Jersey Blue southeast?

A. I could not answer that question without looking through my notes. I can do that.

Q. Well, that will take too much time; we will let it go for the present. Now, to the west have you found merchantable ore in the Jersey Blue, and more specifically, have you found stopes in it?

A. I have seen what I should suppose was merchantable ore in the Jersey Blue, yes.

Q. At a good many points?

A. At a number of points; I could not say how many.

519 Q. Have you followed any of the levels from end to end in the Black Rock workings, or have you followed them all?

A. I have been out—you mean from end to end, from the east end to the west end?

Q. Yes.

A. I have been out from one end to the other on the 1400 Black Rock, yes. I have been to the west end of the Black Rock workings on all of the levels as far as I could go to the east end; some of them are very long and I have not been completely through them.

Q. Speaking about the western portion of these levels particularly have you been on levels that were drifted on what you call the Jersey Blue to the west?

A. I have been on a level which was drifted on what I call the Jersey Blue, yes.

Q. One or more?

A. The one that I recollect instantly is the Black Rock tunnel level.

Q. Is that the only one?

A. I would have to go through the map to answer that question. It won't take but a minute.

Mr. Gray: Judge, when you speak of Black Rock levels you mean the levels of either the Elm Orlu or the Black Rock on the Jersey Blue?

Mr. Scallon: I had in mind particularly the workings of the Black Rock but either one of them, wherever there is a drift.

The Witness: Wherever there is a drift?

520 Mr. Scallon: Yes.

A. In the Black Rock mine on the Jersey Blue?

Q. Exactly?

A. Well, beginning and going down through the levels, on 1000 level I have been out in the drift along the Jersey Blue—you are speaking all the time, I understand, of the northwest segment of the Jersey Blue, as we speak of it?

Q. Exactly; yes, sir.

A. On the Black Rock 1200 I have been on the drift driven on the Jersey Blue.

Q. Well, we won't *lost* time with that. You can look it up at adjournment.

A. That practically covers it, the Black Rock mine.

Q. Now, going up to the tunnel level which you just referred to now?

A. Yes.

Q. What do you find in the Jersey Blue veins there in the shape of ore or anything else?

A. I found clay gouge.

Q. Well, did you find any ore there?

A. Quartz, manganese, some zinc, or some zinc sulphide.

Q. How much of that?

A. I have not made a note of the exact width of it anywhere, the zinc particularly or specifically.

Q. Well, did it look like good strong veins there?

A. The vein looks in places fairly strong and others not so very wide; there is a great deal of zinc in it—this is speaking of

521 the drift along the Jersey Blue vein in the Black Rock tunnel, west of the Black Rock tunnel?

Q. Yes.

A. I have notes here which state that it contains a great deal of zinc and a great deal of black clay gouge, particularly the blackish type I spoke of.

Q. How wide do you make it there?

A. I haven't any notes here on its different widths, but I recollect it was somewhere between two and five feet wide, varying and sometimes dipping down to much less than that; sometimes hardly more than gouge.

Q. Now, Mr. Irving, have you gone up through the various raises of the Jersey Blue to the western portion of it?

A. I haven't been up through them all; I have been through some of them.

Q. Were you able to observe the vein in them or the material in which they were driven?

A. Usually I was able to observe, see it through the timbers, or rather some of the material, I had better say, or gouge, and see that the raise had been driven, where it had been so driven, along the Jersey Blue, yes.

Q. Were they too closely timbered to permit of any detailed observation in any part?

A. I could make detailed observations occasionally.

522 Q. You could see ore in them, do I understand you, at different places?

A. I should hesitate to make a positive statement of that without going through the notes, if you care to have me do that?

Q. You might look it up at adjournment.

The Court: Is the court right in its understanding that both parties are endeavoring to establish that there is a Jersey Blue vein?

Mr. Gray: Yes, we do not deny it. We concede the fact and our witnesses have all described it.

The Court: I am not at all intimating anything about the character of the cross examination, but simply to have this right in my own mind.

Mr. Kremer: There is a Jersey Blue vein, but the interpretation of what it is is entirely different.

The Court: I just want to have it in my mind so as to understand the importance of this testimony.

Mr. Scallon: Now, professor, calling your attention to the structure of the Rainbow?

A. Yes.

Q. If I remember exactly you made a statement regarding there being many offshoots from it. Am I correct in that?

A. Yes.

Q. In what direction do these offshoots run; generally, you know, or specifically, if you can so designate them?

523 A. Well, I don't know that I can answer that question directly and instantly without tabulating the data, but my impression is that there is no given constancy of offshoots. Most of the strands of the Rainbow lode, where we found them, are directed in a generally east and west or northeast and southwest direction.

Mr. Dickson: Northwest and southeast?

A. No, speaking of the Rainbow lode?

Mr. Scallon: Yes.

A. Most of the strands run northeast and southwest.

Q. By "strands" you mean such of them as can be followed definitely for some considerable distance I suppose?

A. Yes.

Q. But take the little spurs, the offshoots, are there any such running off into the wall or into the country from the main body of the lode?

A. There are, particularly on the south wall or the southern boundary little irregular fractures—this is what I meant when I spoke of offshoots—criss-cross, ones over the mineralized fractures, out from those. The degree of difference between what we speak of as the stock work, which is a broken up mass of blocks or joints in the rocks, the solution circulating through these have separated them little or less as it may be, and left corners of rock in between. Now, if you increase the size of the blocks between this stock-worklike and masses, then you begin to get places where they run off a little into the granite and it makes a series of what I spoke of as
524 offshoots; but I should not lay down the rule that these were in any definite direction because the shattering of the granite is sometimes exceedingly irregular. I can not give any definite answer to a question which asks: Is there any definite or usual direction of these offshoots from the south wall of the lode?

Q. Well, now, a little more definite are there places in the Rainbow lode where there are parallel or approximately parallel lines of stopes with either waste or unstoped ground left between, horses or the like?

A. Certainly.

Q. Where you would consider the horses mineralized to a certain extent, or as forming part of the vein?

A. I should say usually they are somewhat mineralized.

Q. Well, now, have you noted anything through these horses in the shape of seams?

A. Yes, I think in these horses you frequently find little joints and seams which are mineralized—very often in fact. The shattering, which has been very extensive within the strand itself and which has allowed the solution to completely alter that rock by giving them an opportunity to circulate did not immediately cease entirely within the intervening blocks of granite. But there are fewer of them and therefore the hardest material is not so completely mineralized. There are all sorts of gradations between the degrees of
525 mineralization of these horses that are included within the strands of the vein.

Q. Now, coming towards the place where these strands come together on the strike and form wedges, are there such places?

A. I think so, yes.

Q. Well, now, approaching the end of the wedge, or the edge of the wedge, how do you find the country between the strands there as to mineralization?

A. About the same as I described it.

Q. Well, have you got an intense degree of mineralization there?

A. I should say a considerable—a greater degree of fracturing within the limits of the strands themselves than in the intervening horses.

Q. Well, do you find seams extending there from strand to strand?

A. I have no doubt there are such. I don't remember distinctly having seen any.

Q. Well, now, doctor, will you please take this sheet of paper and indicate the structure of the Black Rock vein with particular reference to the south line of it?

A. Now, of course, you will understand in doing this that you cannot, so to speak, photograph any particular place, and I cannot state that exact accuracy could be obtained in a diagram-atic sketch.

Q. That will be understood, doctor. It is just a sketch that I want.

526 The Court: What is undertaken to be made, a cross section or a horizontal plane through it, the south wall?

Mr. Scallon: It will be a plane, so that we can see the course and direction of things.

The Court: I think the doctor can make that between now and 1:30. We will suspend at this time until 1:30.

Whereupon an adjournment was taken until 1:30 P. M. of this day, Thursday, October 22nd, 1915.

Q. Have you made that sketch, doctor, that you spoke of just before the adjournment?

A. Yes, sir.

Q. Will you kindly let me see it?

A. Here it is.

Sketch marked Defendant's Exhibit No. 45.

Q. Now, is this illustrative of the type of the principal fracture and the minor fractures of the Rainbow lode?

A. This is typical of some portions of the Rainbow lode, where we see a fairly regular north wall, and where the banding of the vein dips parallel with the wall to the north, and then as you go southward joint planes in the rock running in various directions form a stockwork, and they decrease in number and then finally disappear, and you have an irregular boundary on the south side which is typical of some places. I can show you on the 1200 foot level. That is typical of the more defined offshoots of
527 strands—the 1200 of the Elm Orlu. There are two ways—

Q. Will you illustrate that, please, so we will understand exactly?

A. In this level here on Exhibit 19, where you see the solid floor the ore is solid up to about this point. Apparently it is solid all across that level, but we don't know—but at this point.

Mr. Gray: Won't you designate the point.

Q. You are speaking of south of and west of crosscut 1211?

A. Yes. East of there there are stopes. East of there it is developed into individual strands which do not show on this map. Cross cut 1221 has been driven and shows one of these strands, the Pyle strand, going across 1221, and then a branch vein where these

other strands do not appear. I mean by offshoots, that division into strands, some of which terminate before you get to the next crosscut—before you get to the next place where you would expect to find it; you don't find it; it has disappeared and died out. The mineralization has terminated in there in some way.

Q. Let me understand now, doctor. By offshoots you do not mean little short branches drifting off into the wall, but you mean any long branch, like this Pyle strand?

A. Any long strand that disappears along the strike and has not been followed along the strike beyond where you see it. Those all vary in direction.

528 Q. Does that make a strand when they are not continuous?

A. They are not continuous, no.

Q. Well, the lengths that those are followed, some of them are long and some short, I suppose?

A. Certainly.

By the Court:

Q. Have you reference to short spurs from the main vein?

A. That is the idea, your honor.

Mr. Scallon: We offer this sketch in evidence.

By the Court:

Q. Is that a horizontal plane?

A. That is a horizontal plane. That is only diagram-atic, you understand; it is not to be taken as an actual photographic reproduction of any particular place.

Q. Will you let me see cross section No. 9, if you please? Here you show a portion of the Elm Orlu vein, as I understand it, going down as far as the 1500 foot of the Elm Orlu, and a little below?

A. Yes.

Q. That is extended down from indications in these crosscuts, I suppose?

A. Yes, sir.

Q. These crosscuts to the east or to the west of there?

A. Well, take the 1200, exhibit 19——

Q. I want this particular crosscut here.

529 A. You want 15 first?

Q. I want the 1500.

A. 620 feet west would be about in here that that section would go through.

Q. Then do you understand that the crosscut shown in the cross section as projected is on the east of it?

A. The crosscut, yes, is east.

Q. Then, doctor, the showing of a vein going down is determined from a point farther east and therefore this would be true as to this crosscut here, would it not?

A. Yes. Let's find exactly the point where this body of ore goes across there. Approximately in here (indicating on exhibit 23).

Q. That would be close to the co-ordinate 200?

A. Yes.

Q. Now, which of the red ore bodies of this end, or ore veins shown on crosscut 1511 is supposed to be represented or is intended to be represented in this cross section?

A. I am not sure that any of these matters in here are represented. It may be projected from this crosscut, which I have not visited.

Q. May have been projected from the westerly crosscut?

A. It is approximately half way between.

Q. Taking this crosscut by itself?

A. Yes.

Q. The same would be true, would it that there are veins
530 shown in this crosscut, part of the Rainbow veins?

A. I don't know; I suppose so; presumably is.

Q. Would you kindly draw a line through there (referring to defendant's exhibit 38), showing approximately the Black Rock fault?

A. That is not taken from any particular place. I hardly could do that because it might cross through anywhere and it might be a place where it was not present at all.

Q. I don't want to mislead you or catch you, understand. We will assume that this is at some place, if that be a proper assumption, at some place where the Black Rock fault does go through?

A. Yes.

Q. Then, could you indicate on that assumption how it would cut through there?

A. Where a Black Rock fault might cut through there?

Q. Yes.

A. I don't know as I quite understand what you desire?

Q. Supposing you want to show the Black Rock fault there how would you show it?

The Court: Simply as a type, I suppose.

A. I cannot be sure what amount of offset there might be there, the amount of faulting.

Mr. Scallon:

531 Q. It is shown on this plan, for instance, going through the veins; that is the idea I want.

A. Well, it might go through something like that. That is one of the many possibilities.

Q. Or along it, possibly?

A. Might possibly go along it; might possibly terminate; one side might possibly terminate and the other portion not found beyond the fault.

Q. And, as I understand you, some points it might be in the vein and at other points outside of the vein, ore body?

A. Quite so.

Q. When that Black Rock fault occurred there through the Rainbow lode what was its effect upon the country there? Near it, on each side, if any?

A. Effect upon the country rock?
Q. Yes, or the lode?
A. After it leaves——
Q. No, I mean in going through; when it was formed, as to shattering, or breaking or moving?
A. Well, the ore of the Rainbow lode and the granite substances form fairly well—fairly solid walls. Other times it is very much shattered where the fault passes through.
Q. Well, did the fault increase the shattering or cause additional shattering, due to its own movement and the force which produced it?
A. Additional shattering to what?
Q. Of the country?
532 A. To what there was before?
Q. Yes.
A. There may not have been any before other than what was there to give entrance to the solutions that formed the vein.
Q. Well, of course?
A. I should consider where the walls were materially shattered, that the shattering formed by the vein was increased, yes. It does not always show. Sometimes the break is more even with less shattering of the adjacent rock; at other times the shattering of the adjacent rock is very strong.
Q. Well, now, do I understand that when a fault of that strength occurs that there is sympathetic faulting or fracturing of the country in the neighborhood, if that be a correct expression to use—"sympathetic"?
A. Faults are exceedingly curious in that way. I have seen a great many. There are some faults which are of considerable magnitude where you will find they will pass through country rock and the walls will be offset against each other and there will be relatively a small amount of fracture; in other places there will be an immense, wide zone of broken and shattered material. I have seen places in Leadville, Colorado, where the shattering of the rock was as much as one hundred feet in width. Then again along the same fault you will find a place where it is difficult to trace it and yet you know it goes through, by offsets and everything else, and the
533 walls are simply broken and the fault has a relatively small size and the two walls are not so very much shattered.
Q. Would that depend, professor, on how much the country was already shattered when the vein went through?
A. I would like to be able to answer that question, but I cannot. I have speculated on it a great many times. I don't always understand what the vagaries of faults are due to.
Q. But such a thing is possible I suppose?
A. Will you just repeat?
Q. I mean where the country is already shattered, considerably fissured, then if a fault occurs the shattering is likely to be intensified and added to?
A. If there has been another fault at that particular place which has broken the country rock, and still a later fault cuts through that,

shattering the country rock, it possibly would increase the shattering; it could hardly do otherwise.

Q. Where a big lode such as the Rainbow lode, and a big fissure of this kind, which is a complex fissure as I understand you, occurs and then faulting occurs in that, then what is the likelihood of that shattered country being moved again by reason of the additional faulting or the new faulting, if it be new?

A. Of course, the movement of the fault will cause not only a shattering, but if there is any actual displacement of the two
534 walls, why, there will be a new movement to what had taken place there when the rock was originally shattered.

Q. And the effect of it might be felt outside of the main fissure, would it?

A. Well, as I say, in some cases the shattering is broad and in other cases it is not; it might and might not.

Q. Now, if I understand you, doctor, in this sketch you would have a part of the Rainbow lode where the south boundary was not distinct, where it merely faded into the country?

A. Yes, where it would be a somewhat difficult question to say just exactly where you would consider solid vein and where it fades off gradually. Replacement bodies are very apt to do that.

Q. Depending upon how far south the mineralization extended or the ore formation?

A. Depending partly on the ore formation and partly on the shattering. If you consider a moment, when you have solutions circulating as broadly and as extensively as they did during the time of the formation of this great Rainbow lode, the solutions are likely to find their way into fractures wherever you get them. If the fracturing ceases, then the solutions cannot get into the rock except through the minute pores, and the mineralization is likely—the amount of mineralization would probably not be likely to terminate within the zone of shattering and mineralize only a portion of it; it might, but it would be improbable; and the limits of the
535 lode here are very hard to determine, as you can see from the horses between, where those horses are not as much shattered, therefore the solutions could not get beyond them and did not mineralize them, and where the rock was shattered, solutions could get in. Where the joint planes are further apart the solutions could not mineralize as far from each one of the cracks, and the consequence is you can see big horses of rock in between. Where the shattering ceases the mineralization ceases.

Q. Now, have you noticed places in the Rainbow lode where the south boundary is well defined, marked by gouges?

A. There are some places I think that I can mention. I have noticed a number of them in the upper levels here, where the vein is more nearly upright in position.

Q. Have you noticed any of them in the stopes in the eastern portion of the Black Rock claim, or have you been in there?

A. The eastern portion of the Black Rock claim, in the stopes—when you say eastern portion, how far do you mean?

Q. I would say east of the working shaft of the Black Rock.

A. Speaking from memory I should say that I had, but I had better look it up and confirm it by some particular observation.

Looking through my notes I find that the places where I have
536 observed gouge on the south wall of the Rainbow are rather rare in the Black Rock workings—I say rare—there is only one place here where I have noted that, and that is on the 1500 foot level, and I am not absolutely certain that there may not be another strand of the Rainbow lode south of that observation.

Q. How close to the Black Rock shaft is that?

A. That is 125 feet south of the Black Rock shaft on the 1600 foot level Black Rock.

Q. Now, have you been in the stopes east of the Black Rock shaft on the Rainbow lode?

A. I have been in those portions of the stopes that are actually on the levels at which the drifts are run and the crosscuts. I have not been up into the stopes. In one stope only that I recollect I have been into, and then for just a few sets below the level, and I could not see anything in there, because it was all timbered up.

Q. On these levels did you have a chance to observe the walls?

A. In some places, yes.

Q. Did you notice any gouges there on the south wall?

A. That one that I mentioned is the only gouge on the south wall that I have any record of here—well, here I find another on the 1400 foot level, but that is the Black Rock fault, distinctly marked.

Q. Well, that would not count?

537 A. That would not come into consideration, I suppose.

Q. No. Now, referring to this section, Exhibit 37, will you tell me what your notes are relative to the 1400 Black Rock level at this point, in relation to gouges particularly?

A. Well, I have a note in here where that section passes through the 1400 foot level of the Black Rock, and there I have noted that there is a drift or opening which runs through the center of the stope, but no observations could be made of the walls upon either side; in other words, I knew I was in the vein or in what had been the vein, because it had been stoped and the timbers went up, but I could not see the walls there.

Q. Now will you refer to your notes of the 700 foot level of the Black Rock and tell us what you have noted there as found in Drift 702. Please indicate to the court what drift you refer to?

A. On Exhibit 14 it is this northwest drift, No. 702. In that drift I noted an intersection of 701 and found that to consist of about one foot of quartz and manganese with gouge on the south running up to between eight inches and two feet of gouge and vein material.

Q. Now on which side of the crosscut did you notice that?

A. On the east side of the crosscut in the wall.

Q. Where the wall is not broken?

538 A. Where the wall was not broken.

Q. Now, from there west?

A. From there west I could follow in the roof the vein westward,

showing a strong gouge having a very upright, nearly vertical dip, with vein material along it. I could not see it continuously, every timber, but where I could observe it it was vein material all along until it had reached the Black Rock Fault, represented by this green band—or it is where it reached a strand of the Black Rock fault, and it was there abruptly cut off, faulted and terminated by that Black Rock gouge or clay.

Q. Now, have you stated all that you have observed as being in that fissure in that drift?

A. That is all I recollect that was in the vein. I have not spoken of the offsets of the Rainbow by the faulting.

Q. Well, that would be at the end of it?

A. Yes, at the end of it.

Q. Yes, but I mean in the drift itself?

A. Yes, sir.

Q. Now, can you get down the 450 level of the Black Rock, Exhibit 11. Now, referring to drift 456, will you please tell us what you have noted there?

A. I noted there a very strong clay gouge on both sides of which I could observe a very strong mineralization of pyrites with some particles of manganese mineral in the rock which could be followed as far northwesterly as a strand of the Black Rock fault,
539 with a very strong clay gouge against which it was cut sharply off.

Q. Do I understand that that mineralization was on each side of the clay?

A. As I recollect it, yes, sir.

Q. All the way through, or not?

A. On each side—there is indicated here an additional small gouge to the south; perhaps I had better correct that statement; there is a little wider mineralization to the north, but in places there are two feet of mineralization, consisting more of pyrites than any other mineral.

Q. Just for the sake of certainty, do I understand that there is mineralization on each side, or on both sides, I had better say, of one clay seam, and then another clay seam again to the south?

A. The clay seam that lies to the south of the main clay seam is a very small clay seam very close to it.

Q. But is there mineralization on each side of the big clay seam there?

A. As I recollect, there is, but I would not be absolutely certain about that point.

Q. Your notes do not indicate positively, do they?

A. No. I remember quite well about that clay, though, because I have been there quite recently.

Mr. Dickson: May I ask a question for my own information?

The Court: Yes.

540 By Mr. Dickson:

Q. The mineralization you speak of there lies with a clay gouge on either side of the mineralization, is that what you mean?

A. No, I meant that there was mineralization on both sides of the clay gouge for a portion of this distance here, more on the north than on the south.

By the Court:

Q. You spoke of two gouges there?
A. Yes, and then there is a small gouge here, south of the main gouge marked in there, which is about the center of the drift, half ways between its course here to the Black Rock fault, which lies just about in that position.
Q. How about the mineralization there?
A. It extends right from the small gouge to the larger one.
Q. What is on the other side of the small gouge, if anything?
A. I have no notes as to what I observed there.

By Mr. Scallon:

Q. That mineralization consists of what?
A. It consists of particles of pyrites and some small particles of manganese in the country rock here and there—manganese minerals—and a very heavy development of sericite, that fine grained mica that gives the rock a peculiar pearly look, and is one of the strong features of mineralization.
Q. Do you know by that name a Winchell stope?
541 A. No, not by that name.
Q. A stope above the 1300 of the Elm Orlu; please pull down Exhibit 20.

Mr. Scallon: Do I understand that you gentlemen know it by the name of the Winchell stope?
Mr. Gray: I don't know what it is called.

Q. That would be as I understand it the eastern portion of the stope represented on the plan map Exhibit 20?
A. Yes, sir.
Q. And possibly extending back west from there some distance. Now, have you got notes as to that stope?
A. I have some notes in a raise from 1307, up this raise here, at that point.
Q. That is a raise. Have you got any notes as to the stopes themselves?
A. Apart from the raise that is driven up, no, I have not. I have observed the data in the raise.
Q. Do you know of a raise started from the 1300 Black Rock out west, and running up to the Black Rock tunnel, so-called?
A. This one right here on the model. *A.* Did you say the 1300 foot level Black Rock?
Q. Well, of this raise here, this raise in blue here on the middle of the plan?
A. Yes, that is from the 800 level of the Elm Orlu up to the Black Rock tunnel, up here.

542 Q. Did you see also a raise starting from below here?
A. Yes.
Q. And extending upward with an offset connecting with that?
A. Yes.
Q. That starts from where, from what level?
A. Starts from the 1000 Black Rock and goes up to the 1000 Elm Orlu and then goes on from the 1000 Elm Orlu up to the 800 Elm Orlu.
Q. Well, does it also start from away below there, from here?
A. There is a raise there, yes.
Q. And makes an offset and that would give a connection upwards?
A. It gives a connection.
Q. I mean an opening upwards so that you could go up?
A. Yes.
A. Now, have you been up that raise, or what portion of it, if not all?

Mr. Gray: That is called the Clark raise.

A. I have been up the Clark raise from 1221 drift, where my finger is located, up to the 800 foot level of the Elm Orlu.

Mr. Scallon:

Q. That would be from the 1200 of the Elm Orlu to the 800—leaving off levels?
A. Yes.
Q. What did you find in that raise there?
543 A. Shall I give you the details?
Q. If you please, yes.
A. Beginning with the 1200 level, from 1221 drift for three floors I could make no observations, lagging prevented. Upon the fourth floor I found about three feet of mineral that I could see in one corner of the raise with a gouge on the north side. On the next floor I found a streak of mineral on both sides of the lagging, in between. From there on to the sixth floor I found a small gouge in the center of the raise. Then on the seventh floor there was an offset towards the south—no, towards—yes, towards the south, right opposite the small crosscut which is indicated here and is a continuation of 1117 in the Elm Orlu. Above that point I could see nothing in the raise—I am speaking about that crosscut.
Q. The model is not yet in evidence so it is hard to refer to it.
A. In that raise I have found indications of mineralization going on up to the sixth floor, below the 800 level, and I have no doubt that a vein goes up through that raise.
Q. Did you have a chance to see what sort of a vein it was and see its contents and quality?
A. In places, I did.
Q. What did you see in regard to that?
A. I noted it was mineral matter. I didn't keep any notes as to the exact nature of this material.

544 Redirect examination.

By Mr. Gray:

Q. One question was asked of you today, professor, concerning the character of the gouge in the Black Rock fault and the gouge in the Jersey Blue and you were asked to describe it at two points where you made observations, a considerable distance from the Rainbow lode. I would like to direct your attention to the Jersey Blue vein there where it cuts through and faults the Rainbow lode as you have heretofore described it faulting that. Will you state whether or not at such place you observed drag in the Jersey Blue, or fragments and pebbles in that vein?

A. I noted in the 1500 foot level of the Elm Orlu at this point here, in the 1504 raise (exhibit 23), where the Jersey Blue cuts down and comes in contact with the Rainbow lode that there where the Jersey Blue is made up of a number of clay gouges the zinc ore material of the Rainbow lode has been dragged in in loose, powdery fragments, and pieces in between these gouges of the Jersey Blue, presumably by the movement of the Jersey Blue fault.

Q. In your judgment is that true at the other places where this Jersey Blue cuts through the Rainbow?

A. I have not personally noted or made any notes of any place in which fragments of ore material are found dragged into the Jersey Blue vein by the fault movement, but I have no doubt that there are such places where the Jersey Blue cuts through the Rain-
545 bow. There, the faulting would necessarily produce a dragging in of fragments of quartz and especially the harder material into the gouge. I have not personally made any notes or observations of such occurrences, or recollect now.

Witness excused.

Testimony of Walter Harvey Weed for Plaintiff.

WALTER HARVEY WEED, called as a witness on behalf of the plaintiff, being first duly sworn, testified as follows:

Direct examination.

By Mr. Gray:

Q. Will you state your name and residence?

A. Walter Harvey Weed; New York City.

Q. What is your profession?

A. I am a mining geologist.

Q. Where were you educated and what experience have you had in the practice of your profession?

A. I was educated in the school of mines of Columbia University and immediately after graduation was appointed assistant geologist of the United States Geological Survey. My first work in that organization was in the Yellowstone Park, studying the glaciers and

mapping the sedimentary rocks of that region. Subsequently in the various years engaged in that work I was assigned to study the coal fields of the state and afterwards mapped some ten thousand acres for the geology of the area lying north of the park.

546 In the course of that work I investigated the Castle Mountain mining region and made a geological report on that region. I next examined the Neihart region and published a report on the Little Bell mountains, embracing the geography of that section. I was then appointed expert, I suppose you call it, a mining expert for the Indian Commission, to go down to the gold location, to examine the gold fields there and see what should be cut off in the mineral reservation. Subsequent to that I was in charge of work at Elkhorn and published a report on the Elkhorn Mining district up here in Jefferson county.

Q. For the geological survey?

A. That is all for the geological survey at present. I was then asked by Professor Emmons, who is now dead, to come to Butte and do the general geological work for the Butte Folio, which was published as a folio by the geological survey. Subsequent to that I had charge of the investigation of the Marysville region where my assistant Mr. Burrell did the work and the report was published by him although I supervised the work, in the Marysville gold region. I then returned to Butte and took up the study of the mines here for the Butte Monograph, which has been published by the Geological Survey.

Q. How long were you here studying the geology of Butte?

547 A. The first time in 1896 I was here about a year, and returned and the second time I was here at intervals for five or six years. During part of that time I went on leaves of absence down to Mexico and Nicaragua and to Cuba and subsequently made a trip to the boundary district in British Columbia, where I studied the boundary mines and the Dominion copper properties in that section. I have made a study of the Helena district and the mines embraced therein, which has not been published. In 1906, on the organization of the General Development Company by Adolph Lewisohn and J. Parke Channing, I was invited to join that organization, and resigned from the geological survey and was sent out as their examining engineer and geologist to pick out a good mining property for them to take over, as one of the first for that large organization. In the course of that work I examined the Globe district and Mojave district and the region adjacent and around Parker, Arizona, and was instrumental in selecting the Miami mine in the early days and made a careful investigation of the Ray mine, old mines of the old Dominion Copper properties, and the section around it, and what is now the Inspiration mine and all of that section. I then went to Prescott and Burro Mountain and made an investigation of that district. I was then sent up to British Columbia, where I examined the Hedley, the Rossland mines, the Vonivance mine and other properties at Howe Sound, in the sound district, and several properties on Victoria Island. I was then sent over to Washington and investigated properties

548 near Skykomish. Returning to Idaho I made a report on the Snowstorm mine. During that period I went to Cananea, Mexico, and made a report on this property. Subsequent to that I came to Guanaguato, Mexico, where I investigated the silver region, also the silver country at Taviche and Guadaloupe and Chilpaningo, copper properties, the Parral silver properties and silver-lead properties at Santa Entilia. Resigning from that organization a few years ago I was employed as expert to examine the Ray Central properties and was made consulting engineer for those properties. I was also asked to report on the Butte Superior property which I did in 1910, on the Wolverine in Arizona, and the Shattuck Arizona property, both at Bisbee camp; on the Chispas Silver mine, the Candelaria properties at Ely, the Jerome in the Nevada Gold fields, and made a visit to the copper properties of Haiti, the island of Haiti and I have also been engaged in several suits in camp, including the Butte Ballaklava case which never came to trial, the Parrot case and the Original case for Mr. Clark, which never came to trial, the Alice case also. That brings it up to the present time.

Q. The last few years you have been engaged in private practice, have you?

A. The last six or seven years in private practice.

Q. During that period of time I understood you to say you had made a considerable study of the general geology of this camp?

A. I have.

549 Q. When did you first become acquainted with that vein or lode called the Rainbow lode?

A. In 1896 when I was here for the Geological Survey.

Q. Just briefly state your acquaintance with it?

A. Well, at that time—Professor Samuel Franklin Emmons in charge of the Geological Survey here took me up on the hill with him, and we went over the Rainbow lode from the west end beyond the Moulton mine, eastward to the property here involved; this great Rainbow lode was mapped for the Geological Survey, and that mapping result was published in the folio known as the Geological Folio of the Butte district.

Q. Will you just briefly state the characteristics of the outcrop of the Rainbow lode and how at that time you were able to follow it upon the surface?

A. Well, the Rainbow lode at that time was being worked on the Alice mine, and my recollection is that some work was being done also at the Moulton and the big open cuts which were practically vast stopes and partly reopened by lessees, showed the vein and there were very strong outcrops. The Rainbow is the biggest crack in that section of the camp and perhaps the master lode of that section and it is the one to which Professor Emmons applied the term "lode," gave his definition of lode. It is by all means the largest and most prominent outcrop in the north section of

550 the Butte district; in fact more prominent than any other outcrop in the Butte district.

Q. Was that traceable to the claims in controversy?

A. It was traceable to the Poser mine and my recollection is not

very distinct as to the boundaries of the Black Rock and the Elm Orlu at that time because we were paying no attention to mine boundaries, but were tracing the vein, and we traced the vein down almost to Silver Bow creek, which would bring it down through the Black Rock ground. We knew at that time of the Black Rock-Niagara case and were interested in following over into the Niagara.

Q. Will you state when you first became acquainted with the Elm Orlu mining claim as a claim?

A. I should say it was 1909 or 1910—1910.

Q. How did you come to know it at that time?

A. I was requested by Mr. Clark or Mr. Pyle, his representative, to go upon and look at the property and see whether the stopes which had been made underground by the Black Rock people were proper—did or did not belong to the senator?

Q. That is belonged to the Elm Orlu?

A. Belonged to the Elm Orlu Company, and I was asked to study the ground and find out what the real facts were in the case.

Q. When did you first examine it, in going up there next to that visit—first, in this visit to what extent did you examine the property?

551 *Q.* Why, Mr. Atwater had the 400 foot level of the Black Rock opened for us and I went through and saw the Jersey Blue vein in the extreme west end of the 400 level and I also went through the Black Rock mine from top to bottom practically.

Q. The bottom at that time was where?

A. My recollection is not absolute, but I think it was 1200.

Q. Now, then, when did you next examine these properties or either of them?

A. I next examined the Black Rock independently of the Senator—or I had just previously examined the Black Rock I should say for the Black Rock Company; for the Black Rock Company for Captain Wolvin, but it was not a geological examination; it was to determine the amount of ore and character of ore and whether the mine had been worked satisfactorily and other facts. They expressly left out the geological consideration.

Q. From 1910 to the present time, what has been the character of your acquaintance with this property and approximately how frequently have you seen it and watched the development within it?

A. Well, it has been rather often as I have been here several times a year and have spent several weeks at a time in going over the two properties and trying to keep track of the new work so as to see the work while it was in progress rather than to wait until it was timbered up.

552 Q. Are you familiar with practically all the underground workings that are now accessible or have been during that period?

A. Practically, yes, sir.

Q. Going back for one moment, you spoke of writing a report for the Geological Survey upon the Butte district. In connection with that did you examine all of the mines of the district?

A. I examined practically every mine in the district that was

open, but in this particular section, up in the Rainbow country at that particular time the Rainbow lode mines were closed down.

Q. But you became familiar with the structure as disclosed in other mines?

A. Yes.

Mr. Gray: I would like to mark and offer in evidence the model.

Mr. Kremer: My understanding is that it may be admitted subject to the same conditions as all the maps and plats which are offered in evidence; this same provision also applying to the maps which we shall hereafter present.

The model admitted in evidence and marked Plaintiff's Exhibit 46.

Q. From your experience and acquaintance with the geology of Butte, the vein systems of the district and particularly your familiarity and acquaintance with the structure in and about the properties in dispute, will you state what that structure is, as you
553 have found it and observed it in the development of these properties; what veins you found there and the relations which they bear to one another, giving in the course of your answer your conclusions as to their relative ages and the reasons therefor, using in connection with that and with the answer to the question which I have asked you the model which has been offered and received in evidence, exhibit 46, pursuing your own method?

A. I find that the lode in controversy contains the continuation downward of the same great lode known as the Rainbow lode and worked in the Alice, Moulton, Magna Charta, and other properties; that this Rainbow lode is the largest, in point of outcrop, and one of the larger veins of the old system of the camp; that it is a vein of multiple fracturing, rather than one, a link vein, in many respects, characterized by branches, and by horses of rock, and that this vein is correlated properly with the ore of the Anaconda system of veins of this camp; that it is a replacement vein rather than a crack filled by material; that it is quartz, which is characterized as replacement quartz; that its walls fade into the country rock, and that it is cut and displaced by a later system of veins known generally through the camp as the blue system or northwest system of veins, one of which is shown on this map as the Jersey Blue vein, but a system which throughout the course of the Rainbow lode has cut and displaced it at many points, so the Jersey Blue is
554 only one of many, and possesses no unusual features. This cutting it so well understood and known through the camp that it has been used by geologists and by myself in locating displaced ore bodies; and this second series of veins which I have spoken of as the northwest or fault fractures, known also as the Blue vein, from the famous Blue vein in the Anaconda case, is given in the Jersey Blue vein here. The Jersey Blue vein differs from the Rainbow in having a marked clay selvage, in being a wet vein and not standing up at all well so that workings cave in rapidly, whereas the Rainbow workings which have been made twenty or thirty years

ago are still open. In fact in the 100 foot level of the Clark discovery shaft which was opened for us, it was possible to walk through and I found no debris on the floor at all, although that shaft had not been opened for many, many years. The Niagara tunnel shows similar cases in places although there, of course, much of the old workings is filled. The Jersey Blue system, or the blue vein system, is further distinguished by the fact that the walls, as a rule, are sharp, clear cut, that the granite is not intensely altered as it is adjacent to the Rainbow system; that oftentimes there will be only perhaps a foot or less of alteration found in it, whereas in the Rainbow system it is insensible, the fading is quite gradual from ore into the country rock and oftentimes the pyritization of the granite will extend for many, many feet or many yards.

555 A. The Jersey Blue vein I find has cut through and displaced the Rainbow at several places, and it can be seen independent of the Rainbow, cutting through it, and maintaining its identity at several points. These two systems of veins, the Jersey Blue vein and the Rainbow, have in turn been cut by a barren northeast trending fault, which is called the Black Rock fault in this ground, and is I believe known as the Poser in the adjacent property, and this fault has displaced and cut both the Rainbow lode and the Jersey Blue lode, but in as much as it traverses, throughout much of the surface, at least, the extent of the Rainbow lode, it appears to be a part of the Rainbow lode, although really it is much later. That I think gives the main features of the three systems here, the Rainbow, the Jersey Blue and the Black Rock fault.

Now, in regard to the model, the apex of that Rainbow is shown on this upper surface here, which corresponds closely to the contour map, plaintiff's Exhibit 4, and Plaintiff's Exhibit 46. This model represents the apex as it has been developed on the surface, extending eastward through the ground of the Elm Orlu claim, one branch of it going across the south side line of the Black Rock, and another branch, which is shown also on plan map marked Plaintiff's Exhibit 4, passing eastward as shown here and also in the surface trenches. I find that that lode can be continuously traced

556 downward. I have myself followed it from the discovery tunnel, known as the Clark discovery tunnel here, from the west end line of the Elm Orlu claim, eastward to a point which is shown on this model—approximately 100 feet east of the Clark discovery shaft. I have been down a raise to the old 100 foot level of the Elm Orlu mine, and I find the Rainbow lode shown therein, and the Black Rock fault also. I have not been on the 500 foot level, but have traced it above the 500 foot level.

Q. In your judgment is that vein disclosed in the 500 foot level the same vein that you saw in the 100 foot level?

A. It is beyond any reasonable doubt. I have been in the different levels and stopes, and consider that the Rainbow lode is continuously exposed downward through the workings and stopes of the Elm Orlu mine to the 1000 foot level, downward to the 1100, downward again to the 1200, and through the different raises,

through the stopes on the 1300, and so on continuously down to the 1400, and to the 1500 foot level of the Elm Orlu mine.

Q. Before you proceed any further, referring to the Rainbow lode as it is painted in 1504 drift beneath the surface of the Jersey Blue claim, will you state where in your judgment the apex of that ore body beneath the Jersey Blue is?

A. In my judgment the apex of that ore body is to be found in the representation of the apex of the Rainbow lode on the surface of the Elm Orlu claim.

557 Q. And is a part of the same vein you have been describing?

A. And is a part of the same vein I have been describing.

Q. Now, you may proceed?

A. In addition to the development upon the Rainbow lode within the Elm Orlu mine, I have traced it eastward into the Black Rock mine, and I have found that the vein is continuous downward from the 600 foot level—I think it is—of the Black Rock down to the 1600 foot level of the Black Rock mine.

Q. That is the 500 foot level?

A. I should say from the 500 foot level, yes. It is also seen in the 450 foot level, although I have not been through any raises connecting the 450 and 400 and 500. To my mind there is no doubt whatever of the identity of the vein seen on the 400 with that seen on the 500, and continuously downward.

In addition to the Rainbow workings the model shows in blue certain northwest and southeast fractures, which in the deeper levels of the Elm Orlu mine are known as the copper vein. They are represented here in blue, and have been worked for copper and can be seen coming up to and cutting into the Rainbow lode. They have no connection, as far as I can see, with the Rainbow lode, but are later fractures, and therefore not a part of the Rainbow.

In its eastward course through the Elm Orlu mine the Rainbow lode has split, as is common in the other portions of the
558 Rainbow lode, and it has a branch running off in a southeasterly direction, which we have found it convenient to call the Pyle branch of the Rainbow lode. That will be taken up more in detail later. For the moment, I wish to call attention to the fact that the Jersey Blue vein represented in blue on this model has been continuously developed up and down, and is now known from practically at the surface in trenches above the Black Rock tunnel and other tunnels, downward into our deepest levels. It is shown here with a few small stopes, the longest being found on the 1000 foot level, or just above the 1000 foot level, and its development is so thorough that its relation to the other vein can be very well made out. That it cuts the Rainbow lode I have no doubt. I think there can be no question from the standpoint of a geologist. I have myself seen it in the Black Rock tunnel cutting the Rainbow and displace itself by the Black Rock fault. I have seen it on the 450 of the Black Rock cutting the Rainbow, and in turn cut itself by the Block Rock. I have seen it on the 700 foot level of the Black Rock, again cutting the Rainbow vein, and itself displaced later by the Black

Rock fault. I have seen it in different crosscuts running down through from the Elm Orlu mine, itself, where it cuts through the Rainbow, so that in my mind the Jersey Blue vein is not only comparable in every way with the northwest veins of this camp and has all the characteristics of the northwest veins and is mineral-
559 ized like them, in chutes and not continuously, and like them also has clay selvage, is wet and does not stand up well, but we have positive evidence in this case of its cutting through the Rainbow lode, displacing it, and in turn being cut off. It can be seen not only in the Rainbow down below here, but to the south side of the Rainbow on the 1700 foot level in the crosscut of the Elm Orlu mine.

By the Court:

Q. Do you mean cutting on the dip or on the strike?
A. I mean cutting completely through it. If my hand represents the Rainbow, it comes down like this and has gone through and got out on the other side; it crosses through on the dip.

By Mr. Gray:

Q. When did you see it cut through on the dip?
A. Last night.
Q. On what level?
A. On the 1700 of the Elm Orlu mine.
Q. That is not painted on the 1700 crosscut?
A. No, it is not painted on there.

By the Court:

Q. Is that the crosscut that Dr. Irving referred to in his testimony.
A. The same one, your honor.

By Mr. Gray:

Q. Before you proceed, you said something about the stoping of the ore of this Jersey Blue vein. For how many floors has
560 that been stoped at the place you referred to?
A. My recollection is it is five. I can count it on the model; it is five floors.
Q. And for approximately how long a distance westerly from the so-called Clark——

Mr. Dickson: That is objected to as irrelevant; the extent or magnitude of the ore bodies in the Jersey Blue vein would not seem to be material.

The Court: Oh, we will let him answer. Objection overruled and you may have an exception.

Mr. Dickson: No, I don't desire an exception; it was only to save time.

A. Approximately 330 feet.
Q. I meant east from the Clark?

A. Approximately 200 feet.
Q. And there is one small stope east?
A. One small stope east.
Q. Were there any other stopes that you found throughout its depth upon that Jersey Blue?
A. Upon the Jersey Blue as such, I do not find any. Some ore of the Jersey Blue vein has undoubtedly been mined in mining the Rainbow lode, because it has its common mineralization in places, and it would naturally be taken out.
Q. All right; go ahead Before you leave that, you said something about seeing the Jersey Blue cutting through the Rainbow on the lower levels of the Elm Orlu, the crosscuts and drifts
561 from the crosscuts there; will you just state how you were able to determine that and what convinced your mind that it does so cut through on the 1500 and 1300 and 1400 Black Rock?
A. Why, the evidence of cutting through is shown by the fact that the Jersey Blue has a clay wall, a selvage of attrition material, which goes directly through the Rainbow at a different angle, both of dip and strike from the banding of the Rainbow vein. The evidence is quite clearly shown at a number of points, but the general evidence is so conclusive that I think one can easily follow the Jersey Blue through wherever the exposures are open, right straight through the Rainbow.
Q. Now, you may proceed.
A. The Pyle branch of the Rainbow vein was first called to my attention in 1910, when I was invited to go to a raise starting in the stope on the 1200 of the Black Rock mine, and going upward as far as the 1000. That raise I went through in that year, and found the vein about five feet wide, which came upward with a northward dip, and was shown continuously in that raise, which is represented on this model at this point.
Q. You say a northward dip, do you mean going up northerly or southerly?
A. I mean to say we went continuously toward the south going up. That raise left the vein at some twenty feet or so below the 1000 foot level, and went upward through granite, but the
562 vein was continuously developed up to that point, and again was found in the crosscut. A subsequent development which was made as a result of the desire to know whether that vein did or did not come back and continue upward into the Elm Orlu ground, or whether it apexed in the Black Rock ground, resulted in the putting up of raises and the driving of crosscuts, which raises I have been up, and it shows a continuous development of that vein upwards to the 450 foot level of the Black Rock mine. From that point upward to the 500 foot level of the Elm Orlu mine a vein has been followed which appears to be cut off, or at any rate left a few sets below the 500 foot level of the Elm Orlu mine; so that, while I believe that this vein can be traced on upwards, it has not been actually developed at that point. The further development on that Pyle branch of the Rainbow is shown at a number of other points. It has been stoped on our 900 of the Elm Orlu mine. It is shown

in the 1404 drift, where it has been stoped up about four sets of the Elm Orlu mine. It has been connected across by work on the 1232 drift, which is being driven up to connect with the westward 1106 drift of the Black Rock mine, where a raise has been put upward on a good strong vein, to connect with this, but the connection was not made at the time I was there; I don't know whether it has been made since or not. The 1106 drift has been continued toward the east, with a curve to get around the old and now caved raise—or
563 now filled raise, and that is known as 1141 on this model, and thence eastward to a point where it is cut and displaced by the Jersey Blue vein, again giving evidence of the later age and the fault character of the Jersey Blue vein. We have therefore a development of the Pyle vein on this 1100 and up continuously in a raise to the 800, where in the 804 drift and the 821 drift of the Black Rock mine it has been exposed; upward then through to the 700 foot level, where it is shown in a short drift running out from the crosscut, as well as in the raise; again in a drift of the 450 foot level of the Black Rock mine, where the Pyle vein is well shown. It may be that this Pyle vein continues eastward and is shown in the drift easterly from the Black Rock tunnel, in the drift easterly from the Wolvin tunnel, and in a strand or branch of the Rainbow shown here on the surface, but the connection between those points not having been established by raises, I am not positive as to the identity.

Q. At the point where it has been developed to the highest elevation where you are absolutely positive of its identity, what is its dip?

A. Practically vertical.

Q. Now, then, that strand of the Rainbow upon its strike has been developed from what points to the west, the extreme development?

A. Well, shortly above the 1200 foot level of the Black
564 Rock mine, and on the 1200 foot level of the Elm Orlu mine upward to a point——

Q. Well, I mean upon its strike?

A. From the point where it departs from the Rainbow lode on the 1200 of the Elm Orlu mine, eastward to the point where it unites again with the Rainbow lode, a point shown about the east end of the 1141 drift of the Black Rock mine and in the stopes beneath it.

Q. Where in your judgment is the top edge of this Pyle strand, beneath what claim?

A. The uppermost portion of the Pyle branch is beneath the Elm Orlu claim, within the Elm Orlu claim.

Q. You mean as far as developed?

A. As far as developed; or if this be as seems probable, the upper portion of the Pyle strand or Pyle branch, as I prefer to call it, then it is all within the Elm Orlu claim.

Q. And that has been followed upward as you have described continuously from the stopes beneath the surface of the Black Rock claim?

A. It has.

Q. Now, will you describe to the court the character of the vein

as it goes upward to the point where you last are able positively to identify it, as to whether or not it is a vein of the same strength all the way up, or whether it diminishes?

A. It changes somewhat in its character and its thickness, but maintains its general character throughout, of being similar
565 quartz to that of the Rainbow lode and similar mineralization to that of the Rainbow lode. Its walls are continuous, and seeing this raise before it was timbered, as I have on several occasions, there could not be any doubt as to the identity of the vein which is followed upward.

Q. This raise that you speak of from the 1200 stope to the 1000, is that the raise X, that Mr. Pyle and Senator Clark spoke of, and which has been marked on the plan of the 1200 Black Rock level, the raise or stopes at the point X?

A. It is the same raise shown on this map, and marked X, only it does not come down to the sill floor of the 1200 as I recall it, but we went up through the stopes and into the raise above. I suppose it was really an ore chute that came from one of the stopes. I know we came up through the stopes and entered the raise above.

Q. Was there anything else that you wanted to say about the model?

A. I don't recall anything.

Q. If not we will go to something else. The model is painted with the same colors that you have used upon the maps, is it not?

A. The model is painted in the same way; the Rainbow is represented in red, the Jersey Blue vein in blue, the copper veins which are also northwest fault veins, in blue and the Black Rock fault in green.

566 Q. The surface contours are shown as they are upon Exhibit 4?

A. They are, except that they are shown only every twenty feet.

By the Court:

Q. Assuming that the Pyle spur is as plaintiffs claim it is, do you know where it crosses the boundary line?

A. It is headed for the east end line, but it is not known where it crosses, because the surface development—the main Rainbow lode crosses the west end line and can be seen in the surface trenches along the line, which are cut along there.

Q. Where do you find the Pyle strand to the east?

A. The Pyle strand has not been developed as far as the east end line.

By Mr. Gray:

Q. How close does it come to the east end line upon the 800 of the Black Rock?

A. Well, on the 800 of the Black Rock it must go east of the east end line of the Elm Orlu, the east end line being here.

Q. It is very close to it, at any rate?

A. Well, the point where the cut off occurred, there, would be

very near the east end line; but on the surface the development is not sufficient, and in fact the vein appears to get smaller as it approaches the surface so it would be difficult of recognition in
567 the trenches which have been made for the purpose of establishing its apex.

Q. In other words, you have not been able to identify it above the point you refer to as the 500?

A. Not positively.

Q. If it is there you have not been able to locate it?

A. Like many other branches of a great lode, it varies in thickness, and this particular one appears to sift out as it approaches the surface. The cracking coming from below makes it natural that the mineralization would not be as intensive as it reaches the surface.

Q. But it may not reach the surface?

A. It may or may not. My opinion is that it has not reached the surface. It is entirely comparable with many igneous veins that have an undulating surface and do not reach what is now the surface of the ground.

Q. Have you examined the south line of the Black Rock claim, the boundary between that and the Elm Orlu, for the purpose of ascertaining the point at which the southern boundary or wall of the Rainbow lode, the foot wall, crosses that line?

A. I have.

Q. And will you state where that point is with reference to the southwest corner of the Black Rock claim?

A. Well, as I scaled it off on my map, it was 310 feet east
568 of the southwest corner of the Black Rock claim, measured right along the south side line of the claim.

Q. Is the trench E right on the line?

A. The trench E is not directly on the line; it is a short distance from the line.

Q. What is the fact in your judgment as to the identify of this Rainbow lode, or the vein which is marked in red upon the model throughout both the Elm Orlu and the Black Rock claims, as shown by the workings and the surface indications of its outcrop?

A. I think there is no doubt whatever of its identity.

Q. Going now to the north line of the Black Rock claim upon the model, you indicate the apex as crossing that north line. Do you care to go into that?

A. No. I did not examine as to the point where it leaves the Black Rock.

Q. Then taking up the Jersey Blue vein again and referring to Exhibit 8 will you state where that Jersey Blue vein is in the Black Rock claim as it traverses that claim toward the southeast; I mean with reference to the workings shown upon Plaintiff's Exhibit 8 which are over it west of the discovery shaft?

A. The workings of the Black Rock tunnel, which is not very far below the surface, discloses the Jersey Blue vein continuously from the point near the west end line of the Black Rock claim eastward to a point shown on Plaintiff's Exhibit 8 by transit point 1052,

and at that point the Jersey Blue vein is cut off by the Black
569 Rock fault, but a crosscut through the Rainbow discloses the eastward continuation of the Jersey Blue vein, which correlates with the same vein or the same character of vein on the same general strike shown in the drifts from the Clark tunnel, passing through transit point 1058. That would give a course which would carry the Jersey Blue vein through the south side line of the Black Rock claim.

Q. What have you to say with reference to these workings marked No. 1-E, and the blue shown there, and in the other little drift, and also those crosscuts which are shown upon the map as being in country rock between that point and crosscuts 8 and 9?

A. The map represents the veins as I see them; it shows a branch of the Jersey Blue running eastward, and thinning out and cut off by northwest clay slips so that beyond transit point 199 no Jersey Blue vein or branch can be recognized, and nothing is reached until the typical strong and well-developed Rainbow lode is encountered in the Black Rock tunnel and at transit point 808 and transit point 8.

Q. Is it possible to follow these little blue seams that are followed out to the northeast in the No. 1-E and up to station 786; can any part of them be followed any further?

A. No; I have gone through those workings very carefully and with great pains, endeavoring to see if they could not be followed through there, and I find there is no continuity.

570 Q. Where in your judgment then does the Jersey Blue vein go in its southeasterly direction from transit point 831?

A. Through the south side line of the Black Rock claim.

Q. As you have described it along the drift?

A. As I have described it through drift 4 and drift 25 and through the drifts in the Clark tunnel at transit point 1058.

Q. Have you examined the character of the gouge material in the Jersey Blue?

A. I have.

Q. And what have you to say with reference to there being drag in the Jersey Blue vein as it passes through the Rainbow?

A. The Jersey Blue vein as it passes through the Rainbow contains an attrition breccia and clay, made up of the material through which it passes, and in the granite and clay small particles sometimes as large as peas and sometimes larger or smaller, it is made up of the granite and the aplite through which it passes. In the Rainbow lode particles of zinc have been observed in it.

Q. More or less drag ore?

A. Well, it has been broken off and dragged in, fragments of ore presumably carried along; I cannot tell where they came from, but they are present in the vein.

571 Q. With reference to the gouge in the Jersey Blue, does it contain fragments or pebbles?

A. It does.

Q. Have you made any particular investigation to ascertain what the fact is?

A. At the point shown in the Black Rock tunnel just referred to where the Jersey Blue and the Rainbow are together, there is drag material and a little clay seam of perhaps an inch or an inch and a half to two inches in thickness, which contains small particles of material that appears to have been broken off from the Rainbow. This southern segment also contains fragments of quartz and manganese which appear to have been broken off; the fragments, however, are not as rounded as those found in other parts of the Jersey Blue vein where it traverses the Rainbow lode.

Q. Have you with you any of those pebbles or fragments, Mr. Weed?

A. I have some that were collected this noon from the point indicated here on the map, but they are pretty muddy and not very typical.

Q. These are the pebbles that you have in this box?

A. Yes.

Q. Now, you say that those were secured from the Jersey Blue vein near that station 10?

A. Right up here.

Q. Well, let us get the station number?

A. I think it is 1052, but there is a line through it.

572 By Mr. Dickson:

Q. Where it comes in contact with the Black Rock fault?

A. Yes, where it comes in contact with the Black Rock fault and with the Rainbow lode.

Q. The Black Rock fault lies between it and the Rainbow lode?

A. As represented here.

By Mr. Gray:

Q. Was this exhibit taken from the Black Rock fault or from the Jersey Blue?

A. I took it from the Jersey Blue. I took great pains not to take it from the Black Rock fault or one of the seams.

Mr. Gray: I offer this box in evidence.

(Box of specimens admitted in evidence marked Plaintiff's Exhibit No. 47.)

Q. The gouge that is upon these fragments is the gouge of the Jersey Blue?

A. Yes, sir.

Q. And the fragments you found——

A. These are simply apparently pieces of quartz that have been dragged—broken off the Rainbow lode, and are in the gouge, but not rounded. I might add that these pebbles are distinctly separated, and are not part of a band of quartz, but that they are distinctly isolated in the clay.

573 By the Court:

Q. At this point, Dr. Weed, as far as the map is concerned, it has somewhat the appearance as though the Rainbow had faulted the Jersey Blue. How about that?

A. That is due to the fact that the Black Rock fault, passing through here, has dislocated both the Jersey Blue and the Rainbow, and also to the fact that a strand of the Black Rock fault on the south side of the Rainbow has caused a cut of a fragment of the Jersey Blue, and that fragment undoubtedly would be found with careful development in between here, the Jersey Blue being itself cut off by the two strands of the Black Rock fault.

Q. Is the Rainbow continuous through there as that map would seem to indicate?

A. The crushing is so great between those two strands that it is impossible to say whether it is or is not. For instance, at about five feet south of this northerly strand of the Black Rock there is clay, manganese—solid manganese and quartz. From here on it is crushed and muddy, and it is impossible to say positively whether it is Rainbow or crushed Jersey Blue or what it is, but the Jersey Blue runs up to that point, it appears, and is cut off by the Black Rock. The evidence at that point of the Jersey Blue having cut the Rainbow is not so clear as it is at other places.

Q. I was just inquiring how much the appearance of the map indicated the true state of affairs?

574 A. That is because there are two strands represented in green of the Black Rock, one on each wall.

(Recess.)

Cross-examination.

By Mr. Kremer:

Q. Doctor, you stated that you have been familiar with the underground workings of the Black Rock since 1910?

A. Yes, sir.

Q. And as I understand you, you were engaged by the Clark Montana Realty Company to make an investigation of the condition geologically, existing in the Black Rock and Elm Orlu mines?

A. Yes, sir.

Q. At what time in 1910 was that, if you recall?

A. Why, I don't recall the precise time.

Q. Approximately?

A. I was asked before I made an examination of the Black Rock mine for Captain Wolvin, I had been retained in case any necessity arose for a study of the geology, retained by the Clark interests.

Q. That retainer dates back to a time prior to the examination you made for Captain Wolvin?

A. It does. I may state, however,—the examination made for Mr. Wolvin was begun by myself and I was obliged to go to Arizona

and my partner, Mr. Frank Provert did the major part of the work.

575 Q. Do I understand you to say that that examination was made in 1909?

A. No, I thought I said it was made in 1910; that is my recollection of it.

Q. You mean the examination for Captain Wolvin?

A. That is the one I am referring to.

Q. And at that time you had been retained by the Clark-Montana Realty Company?

A. Some little time previous to that.

Q. What do you mean by "some little time previous to that"?

A. My recollection is that it was about four or five months previous to the time Captain Wolvin spoke to me about it.

Q. Then you were retained in this case sometime in the early part of 1910, I would say?

A. I presume so.

Q. Immediately after being retained, did you visit the underground workings of the Elm Orlu and Black Rock Properties?

A. Of the Elm Orlu only.

Q. Kindly state what development there was at that time in the Elm Orlu—briefly I mean?

A. Well, I saw the 500 and the 700 and the 900, and my recollection is that I went down as far as the 1200.

Q. In the Elm Orlu?

A. In the Elm Orlu, but I have not the dates fixed positively because at that time the matter was not critical at all and was

576 more with the idea of seeing what development work should be done. In talking it over with your own superintendent and Mr. Clark it seemed to me that both sides were anxious to find out what the facts were and the idea of litigation was not in the mind of either.

Q. The development in the Elm Orlu at that time had extended to what depth?

A. I don't recall the bottom level in 1910.

Q. Was it lower than the 1200?

A. I can't say. I don't remember positively as to the date because I have made so many visits throughout these several years, that I can't precisely fix the date at which the development was 1200 or below.

Q. The Black Rock at that time was developed to what depth?

A. The Black Rock was to the 1200 level if I remember right.

Q. And upon that visit to the Elm Orlu did you cross into the Black Rock workings or any connection that the Black Rock had made?

A. I think that I went into your 1200 stopes where you were within the Elm Orlu ground.

Q. Did you go into the Black Rock at all upon that visit?

A. My recollection is however that the first visit — the stopes of the Black Rock company laying within the Elm Orlu claim were

made in 1911 or very close to that. I know I made a visit
577 about December 29th, 1910. It may possibly have been that I went in there in 1911.

Q. Well, now, since 1910 have you been engaged continuously—I don't mean constantly, but continuously in connection with the geological conditions on these two properties?

A. Some six months subsequent to the rendering of the report to the Butte Superior Company on the geology and value of the mine I took up the study of the Black Rock and Elm Orlu properties for the Senator, yes, and I have been more or less continuously engaged in that work since.

Q. When you say you were engaged in the study of the geological conditions I assume that you were engaged in connection with watching the progress of the ore development?

A. Hardly the ore development, because I was paying no attention to the financial side of it, except in as much as they were anxious to find out the real geological facts and their application to the ownership of the body of ore.

Q. Well, that was a necessary incident to the geological situation, was it not?

A. It was.

Q. And to that extent——

A. But no attention was paid whatever to tonnage or to the value of ore or the seeking out of new ore bodies to be worked.

578 Q. Certainly not, but the continuation of the ore bodies was an incident to your geological study?

A. The continuation downward, yes.

Q. And when you made your examination of the Black Rock in 1910 to what depth had the Black Rock been developed?

A. As I stated a few minutes ago I believe it was the 1200 foot level, the deepest level at that time.

Q. And if I understand you correctly you visited what we will characterize generally as the eastern portion of the Black Rock at that time?

A. I did. I regarded that as a remarkably promising bit of territory.

Q. And it was at that time that you came in contact with that raise you have referred to?

A. No, that raise was called to my attention. Mr. McLeod, your superintendent when I was with Mr. Pyle and somebody else—Clark also went over there.

Q. Do you remember when that was?

A. I don't remember exactly, but I imagine it must have been early in 1911.

Q. To what depth was the Black Rock developed during the year 1911?

A. I don't recall the depth to which it was developed at that time I didn't keep track of the deeper levels at all.

Q. To what extent was it stoped up to the 1200?

A. Quite extensively.

Q. In 1911?

579 A. It was opened up, the small light stopes were opened up for a large area.

Q. Extending in what direction?

A. Easterly and westerly.

Q. And in 1912 do you recall the development in the Black Rock in so far as the stoping has application?

A. I don't recall the precise development for that particular year, as differentiated from other years.

Q. Not the precise development, but generally speaking, the development?

A. Generally speaking, yes, the development was being pushed; you were getting out a great deal of ore, and stopes which were accessible one month would be finished and inaccessible in another.

Q. But you saw the property frequently enough; you have followed it yourself in various places as I understand it?

A. I was watching more particularly for walls and extent of the ore bodies and trying to get at the geological structure, and paying very little attention to the commercial aspect of it.

Q. I am not referring to the commercial side of it, but I mean the extent of the ore deposition and the extent of the stoping upon the ore; you did observe that from time to time?

A. Yes.

Q. To what depth, in 1912 was the Black Rock developed, in your visiting your ore bodies?

580 A. I just stated that I can't recall to what depth they were developed in particular years.

Q. Well, at the end of 1912, what was the state of development?

A. I don't recall precisely.

Q. Well, had they proceeded to deeper levels?

A. I don't recall the depth at which they were developed, and I don't recall the first time I saw your 1600 foot level?

Q. Do you recall the first time you saw the 1400 foot level?

A. I think that was in 1913 or '14—in 1913 that I saw the 1400, if I remember right.

Q. And the lower levels were reached thereafter?

A. Yes.

Q. In other words, there was a continuous development in the depth and a complete stoping of the ore developed in attaining that depth?

A. You were reasonably diligent in sinking the shaft and there was certainly a very rapid and continuous development of the stoping.

Q. Then it is fair to say from 1910, when you made your first visit to the Black Rock, assuming that the lowest level that you visited at that time was the 1200, that the development continued downward as well as in stoping in the ore bodies disclosed on these various levels?

581 A. It did except it was—you developed much more, because you had already opened so much more at other levels there was no need of sinking deeper.

Q. And all of these things came under your observation during the time that you were retained by Senator Clark to examine and make a study of these properties?

A. In a general way. It should be remembered, however, that the easterly end of the Black Rock mine was at that time not considered to come within the particular scope of this study because you were so well beyond the Elm Orlu end line that I did not feel it necessary to make detailed and close observation at that time.

Q. It is your practice, is it not, doctor, when being retained on a controversy, to make a particular study of all of the geology?

A. You have to draw the line somewhere; you cannot take in the whole country.

Q. No, but can't you take in the claim, all of the entire claim that you were engaged to examine and don't you do so?

A. Why, I visited the sill floors as you developed them and noted the character of ore and went up into many of the stopes.

Q. You stated that you visited the raise which we now refer to as the raise development in connection with the Pyle strand, with Senator Clark in what year?

A. Early in 1911 I think was the year.

582 Q. And state what you did when you visited the 1200 foot level, in that connection?

A. Why, I made two trips to the raise and climbed up through noting the—so far as possible, wherever the lagging permitted and peering around the corner to see that the vein was continuous up there, and traced it upward to a point where the raise became vertical and left the vein and came up through the granite to the crosscut.

Q. You observed the conditions that existed?

A. I observed the conditions that existed.

Q. And would you kindly indicate upon the model how far you ascended during that investigation?

A. My recollection is that we ascended above what is now the 1100 foot level to a point approximately I should say between 35 and 40 feet below the 1000 crosscut.

Q. Upon what level—that is upon the 1000 level to what—1000 level of what property?

A. 1001 crosscut of the Black Rock mine. The precise date I don't remember because I didn't make any note in my note book.

Q. As I understand then there was a raise through there at that time?

A. There was a raise through at the time of my visit. The date, as I said, I am not precise about; I can't recall the precise time.

Q. You say that you visited the top of that raise upon that occasion?

583 A. I did.

Q. At that time did you suggest any further development along the ore or the vein disclosed at that time, at the topmost part?

A. You mean to your people?

Q. No, to Senator Clark or to any one at all?

A. Why, it was thought at that time that vein——

Mr. Dickson: Never mind what was thought.

Mr. Kremer: Just what did you do; did you suggest any development?

A. Yes, that was suggested by Mr. Pyle, and I don't recall whether it was discussed with the Senator or not.

Q. Well, did you direct a continuation of that raise?

A. No, I did not direct it.

Q. Did you suggest to Mr. Pyle that he direct a continuation?

A. I suggested first that a crosscut be driven to find whether that vein would show in the upper levels.

Q. Well, was such a crosscut driven?

A. Such a crosscut was driven and a vein did show.

Q. Where is that crosscut, give it a name and point to it.

A. The crosscut is 901 I think it is about here.

Q. Who drove the crosscut?

A. I suppose the Butte and Superior Company.

Q. At the instance of the plaintiff in this action?

584 A. Why, presumably. I have no personal knowledge of that fact.

Q. It is your impression?

A. Yes.

Q. You say you cut a vein there?

A. A vein was cut there.

Q. When?

A. I don't remember the date, whenever the crosscut was driven. I wasn't here at the time the crosscut was put through.

Q. Doctor, do you remember approximately the time—that is all I want—I realize it is impossible for you to say any particular time.

A. 1911 I should say roughly, the latter part of the year.

Q. And you observed that vein?

A. Subsequent to the time when that crosscut was driven I visited Butte and went out through the crosscut, found the vein at the point indicated on the model and noted in a general way that it corresponded with the vein down below here and at that time it was thought advisable that a crosscut should be driven on to the upper level, the 800, to see whether it would be cut through there.

Q. Was there such a crosscut driven?

A. There was such a crosscut driven and a vein was found and then a raise at some time to me unknown was drifted upward and downward—raises were made to connect the veins.

585 Q. Now, confining yourself to the crosscut on the 800 foot level, who did that, driven under the same conditions, was it?

A. It was at the request I suppose of the Elm Orlu company.

Q. And you saw the vein in this crosscut?

A. I did.

Q. Did you make any further suggestion as to other crosscuts being driven or any further work being done with a view to developing that vein?

A. As near as I can recall it was suggested by myself—or rather others suggested it and I concurred, that a drift should be put on the vein to see where it went to.

Q. Was such a drift driven?

A. Such a drift was driven as indicated on this map, as 804 and 821.

Q. And do you remember the approximate time when that drift was driven?

A. Either 1913 or 1914, I should say '14.

Q. And from that drift a raise, as I interpret the model, was begun and continued upwards?

A. It was.

Q. To what point?

A. To a point corresponding with the level 451 from that crosscut of the Black Rock mine.

Q. And at whose instance was that crosscut driven, if you know?

586 A. This crosscut was driven by the Butte Superior Company, so far as I know, but whether at the instance of the Elm Orlu or not, I am not certain. It was almost obliterated when I first visited the mine.

Q. Now, please indicate just where the top of the raise is, as driven on the model?

A. The top of the raise coming upward from the 1000 foot level or the 1001 south crosscut of the Black Rock raise to a corresponding southerly crosscut on the 450 level, known as the 451, the top of that raise as indicated on this model is 100 feet south—100 feet east of the south crosscut 451?

Q. Then what was done by way of development?

A. Well, to meet that raise a drift was run out on a vein found on that south crosscut and which corresponds in character and position to the Pyle branch—and a drift was run out to meet the top of that raise.

Q. And from the westerly end of that drift what further development was made?

A. Along side the crosscut a raise was put up at some time to me unknown to connect with the 506 drift or crosscut of the Elm Orlu mine.

Q. What level is that?

A. That is the 500 foot level and the 506 working.

Q. Now, you have been upon the raise which extends from 451 crosscut to a point in the vicinity of the 506 working?

A. I have been there.

587 Q. And what is the condition of that raise—what was the condition when you saw that raise—I mean that portion of the raise extending upward from 451, at the time of your visit?

A. At the time of my visit it was possible to see that a vein had been followed upward to a point approximately fifty feet above 451, and at that point the workings passed into altered granite and I no longer was able to identify postively any vein going upward.

Q. Was the raise open through the 506 opening?

A. It was the last time I was there.

Q. You stated upon direct examination that you followed it up from the 450 Black Rock to a point I believe you said just below the 500 Elm Orlu where the vein appeared to have been cut off?

A. Why, there is a small clay slip through there which might or might not cut off the Pyle branch of the Rainbow lode.

Q. It would be your judgment, I assume from your statement, that it was cut off?

A. It would be my judgment that it was cut and displaced somewhat there.

Q. Have you ever noticed in connection with what you found there—what was the magnitude of that clay slip?

A. My recollection of it is that clay slip is only a few inches, possibly as much as three inches in thickness, but it is faded out and broken so that the crushing of the granite is such that I
588 should hate to say just exactly how wide the fault itself might be.

Q. I assume, Doctor, that you have detailed notes?

A. I made no close, detailed notes of this material here because it is so very badly broken it is impossible to put in all the little slips and interlacing fractures.

Q. Then, do I understand you to say that you have no detailed notes of that particular portion of this development?

A. Only between the 506 and the top of the vein.

Q. You have no detailed notes then?

A. No, I made no detailed notes except as my remembrance is correct.

Q. You stated that you believed that that ore or that vein, if we so characterize it, could be traced upward?

A. Why, I know it was traced upward to this point.

Q. Now, that is not my question, doctor.

(Question read.)

A. Why, I have indicated on the model the point at which it is no longer visible.

Q. I understand that, doctor. But you stated that you believed that that could be traced upwards, did you not?

A. I believe that vein could be traced further upward. How far I do not know.

Q. But in that connection you pointed to this working and
589 a mineralization as shown upon the model, saying that it might be this. Would you kindly define that so we can get it in the record?

A. It is the extreme easterly drift from the Black Rock tunnel.

Q. Will you please step to your tunnel map and indicate where that drift is upon that map?

A. It is drift marked No. 24 on plaintiff's exhibit 8.

Q. Doubtless, doctor, you have made an examination of that drift?

A. I have examined that drift.

Q. Have you been through it once or a number of times?

A. I have been there once.

Q. Upon the occasion of your visit you took notes?

A. I did.

Q. You have those notes, have you?

A. I believe so.

Q. Can you turn to your notes and state what you found in that drift?

A. I found a vein where I noted a two inch width of quartz with clay slips on either side and in places vuggy, and of a silver vein type.

Q. And, in your judgment, doctor, is that the same vein that we found below at or near the top of the raise extended from the 451 Black Rock crosscut?

A. The evidence at hand is not sufficient to form a positive opinion and for that reason I have said this may be the Pyle branch.

590 Q. Then, as a geologist, I understand that you say that you have not sufficient information to identify or to establish this vein from the one at 451?

A. I have not sufficient information to make a positive correlation.

Q. What is the dip of that vein that you find upon the map, plaintiff's exhibit 8?

A. I have noted it would be nearly vertical.

Q. Well, you say "nearly vertical"; how nearly vertical? Can't you express it in degrees?

A. I have put it that way; I have written it "nearly vertical" because it may be slightly to the north in one place and slightly to the south in another.

Q. Would you say it did not dip to the south?

A. In places, yes. I have just said the walls vary slightly from a slight dip to the north to a slight dip to the south, so I call it "vertical."

Q. You have no notes upon that to show what the exact dip is?

A. I have said "nearly vertical." As I use that expression it means between 85° and 90°.

Q. To what?

A. To either side. Where a vein wall is warped, a vein wall may come warping it this way and if you have a dip at one point it would be slightly north and another point it would be slightly south, and at such places why, it is nearly vertical. I state "nearly vertical" indicating that it might be a slight deflection either one way or the other.

591 Q. As a geologist, and I might add "engineer," you would not say that had a southerly dip?

Mr. Gray: It seems to me that has been answered quite fully.

Mr. Kremer: He can answer that and then we will pass it. I want to know what the general designation of the dip in that vein is if you can give it?

A. I have answered that by stating in my judgment the vein is vertical.

The Court: He just told you that it varies from a north dip to a south dip, and I don't see as you can force him to accept one or the other.

Mr. Kremer:

Q. Kindly project this vein disclosed in 24 drift, exhibit 8, across the line of the Elm Orlu, and state what line it will cross and where, if it continues as is indicated upon plaintiff's exhibit 8?

A. Continuing the line as indicated in the face of that drift, and projecting it across the south side line of the Elm Orlu claim, that projection—that imaginary projection of that small slip would cross the line at a point 277 feet west of the southeast corner of the claim.

Q. Kindly state, Doctor, how far below the surface drift 24 is?

A. The elevation of the tunnel is 5964 feet, and there would be a slight upraise that would probably bring that to 5966 feet at that point.

Q. And the difference would be?

592 A. The difference as shown by the elevation at the collar of the east shaft of the Clark workings, which is 5989, so that the difference in elevation, assuming that at this point there is no declivity, which of course there is—it would be impossible to give it with absolute accuracy.

Q. Well, give it as near as possible.

A. 23 feet.

Q. Now, Doctor, kindly step to the model a moment. How far is it in depth from the vein or veinlet which we have referred to as being disclosed in drift No. 24 upon Plaintiff's Exhibit 8, to the point where the mineralization is cut off in the raise extending upward from the Black Rock crosscut 451 as disclosed upon the model?

A. How far horizontally or vertically?

Q. How far vertically?

A. Do you wish it absolutely or approximately?

Q. As near as you can give it; if you can give it absolutely we would like it.

A. I can take the elevation of the Black Rock tunnel and the elevation of the 500 of the Elm Orlu mine and give you that distance.

Q. Well, what is the difference between it?

A. But if you want a quicker answer I can give you the result here on the model.

Q. You had better give it to me exactly; you can do it without much difficulty?

A. 310 feet. It checks out on the model.

593 Q. I am referring to the slip that you mentioned in your testimony as existing at the top of the ore as you term it, disclosed in the raise extending upward from the 451 Black Rock crosscut; which way does that dip?

A. That dips to the south, a southerly dip of 50 degrees.

Q. Now, doctor, you stated generally, I think, that there was a clay selvage in what you designated as the Jersey Blue vein?

A. There is.

Q. If I understand you correctly, you characterized the Jersey Blue vein as one of the systems of northwest-southeast veins?

A. I believe it belongs to the system of northwest-southeast veins, known commonly as the Blue vein system, and including in this

vicinity the Jersey Blue, the Edith May, the Emily, the Crœsus, the North Berlin and other veins.

Q. And going north, the Deadwood?

A. The Deadwood, yes. The veins I have mentioned vary considerably in their course, and the term northwest is a convenient one to distinguish them from the easterly and westerly veins, but the term is misleading, because the veins vary considerably in direction, and the term is not absolutely correct.

Q. You mentioned the Emily vein?

A. I did.

Q. Just by way of illustration, I will ask you if the Emily vein also has a clay selvage?

594 A. It has.

Q. Is that post-mineral?

A. In places that is a post-mineral selvage, but there is also a selvage that is original with the vein, and when you get outside of the ore chute, the Emily vein consists of nothing but a clay selvage with crushed material between.

Q. Do you differentiate; do you say it is post-mineral in part?

A. No, no. Many of these veins here have been reopened——

Q. Pardon if I interrupt you, but if you will answer my questions I will be through with you pretty shortly.

A. All right.

Q. Is that clay selvage in the Emily vein, which you characterize as a vein of the same system as the Jersey Blue, post-mineral? That ought to be a simple question for you to answer.

A. What particular clay selvage do you allude to; there are several on the Emily vein.

Q. Well, describe the several and tell us which of the clay selvages are post-mineral and which are not?

A. The Emily vein in general is characterized by a clay selvage, which is original and belongs to the Emily vein, and is not post-mineral; but in places where later fractures have run up against that vein and followed it for a distance, there are later selvages which are really later and form no part of the Emily vein.

595 Q. Then, speaking of the Emily vein throughout, you would say that a portion, or at least a certain clay selvage is post-mineral, and certain other selvage is not?

A. No; speaking of the Emily vein throughout, I would say that there was a clay selvage which was an integral and original part of the vein, and that where later fractures have intersected the vein and have run along with the vein for a certain distance, again leaving it, they are marked by a selvage which is post-mineral.

Q. You have characterized them in other times as being a post-mineral fracture?

A. I say that in the Emily vein as in other veins, re-opening has taken place, and therefore occasionally we have a strike fault, which will follow, and leave a vein and the term compound vein has been used sometimes to show where one fracture has been imposed upon an older fracture. We have the same thing in the Rainbow lode at times; we have the Black Rock fault running along the Rainbow

lode, making a selvage, apparently the wall of the Rainbow, but no one who was familiar with it would say that that was the original wall of the Rainbow lode.

Q. But isn't it something of a characteristic of the general system known as the northwest-southeast vein system that there has been a post-mineral movement?

A. I don't think that it is a characteristic of the northwest
596 system of veins, the so-called blue vein system, to have post-mineral movement.

Q. You find it, do you not?

A. I don't recognize it in general.

Q. What would be the indication of a gouge as the result of post-mineral movement; what would you find in it?

A. A gouge of post-mineral movement would include in its material the different minerals through which the fracture had passed; if it were in gold ore, it would have ground up gold ore, ground up and crushed fragments of gold ore, and if in silver ore——

Q. Well, parts of the veins through which it passed?

A. Exactly; it was composed of veins through which it passed; but if the fractures passed through barren ground, of course it would be barren granite.

Q. Naturally, but I was speaking of passing along or through a vein?

A. But the vein may be unmineralized, and in that case it would be impossible to have mineral.

Q. But it would have a portion of the mineral contents if there was any mineral contents?

A. If there was any. That is what I wish to bring out, if there was any.

Q. Of course the Black Rock fault, so-called, is post-mineral?

A. As far as we know it is post-mineral. I mean that it is not only later than the Rainbow and later than the still more recent
597 Jersey Blue, but it has no individual mineralization of its own.

Q. I was not quite able to grasp just what distinction you drew between the gouge of the Black Rock fault and the gouge appearing in the Rainbow as you designate it, and the gouge appearing in the Jersey Blue as you designate it.

A. I have just stated that the Rainbow lode is followed in part by the later Black Rock fault, and where that happened the Black Rock fault has made a streak of clay which will either pass through the vein, or in many places, as shown on Mr. Irving's sketch, it has formed the wall; and where it does, it forms the apparent wall of the Rainbow lode, so that the Rainbow lode is apparently bounded by a gouge, which is really the Black Rock fault.

Q. And in character what is that?

A. In character the Black Rock fault will be composed of either fragments of ore and crushed quartz and manganese, or if it passes off of the edge of the Rainbow lode so that it lies between the Rainbow lode and the granite, it will be composed partly of granite and

partly of ore; more likely of granite, because that rock is more easily crushed and broken than the harder quartz of the Rainbow lode.

Q. In its general nature it is a consistent, tough gouge, isn't it?

A. In many places it is a tough, leatherly gouge, if it is partly dry. If it is partly dried it can be bent like a piece of leather; when
598 it is wet, it is runny, and soft and mushy, and will run like tar.

Q. You say the gouge you found in the Jersey Blue has similar characteristics?

A. No; I say that it is an attrition breccia.

Q. How did you distinguish the two on your direct examination?

A. I distinguished the two because they occur in a different way.

Q. You are not distinguishing them in their nature?

A. Mineralogically it is impossible to distinguish them, because the Black Rock fault passes through many different kinds of rock and ore.

Q. Now, you are unable to distinguish them from the standpoint of their contents, you say?

A. No.

Q. Now, you have stated generally that the Jersey Blue is a fault vein, and faults the Rainbow as you designate it at a number of places?

A. That is correct.

Q. And you have referred, I believe, to Plaintiff's Exhibit 8 as one of the places?

A. I don't know that I referred to that as exhibiting the faulting of the Rainbow.

Q. Well, I misunderstood you. Do you now refer to it as one of the places where the Jersey Blue faults the Rainbow; I mean at one of the places where it is shown?

A. I referred to it as one of the places where the Jersey
599 Blue is cut off by the Black Rock fault, and where the Jersey Blue itself is undoubtedly faulted, and a portion of it should lie in here between the two strands of the Black Rock fault. It unquestionably could be proven, if it were not that the strands of the Black Rock fault have quartz of the Rainbow lode, and the Rainbow lode was itself cut by the Jersey Blue, so we have the same structure which was found in the 702 drift of the Black Rock mine, and in the drift from the 450 south crosscut, which is not shown here because of the general crushing.

Q. Now, so we can clarify the matter, if I may endeavor to do it, in so far as the Jersey Blue being cut by the Black Rock fault is concerned, for the purpose of this controversy, that would take place regardless of this controversy and regardless of anything that might have been said, geologically, whether the Jersey Blue was of the same age as the east-west vein or whether of a different age, because the Black Rock fault is later; wouldn't that be true?

Mr. Gray: Let's have that question read.

Mr. Kremer: Well, I will withdraw the question and ask another.

Q. The Black Rock fault is later than the east-west or the northwest systems?

A. It is.

Q. And if the Black Rock fault in its course traverses either one of these, it would fault it?

A. It would.

600 Q. Now, eliminating that from your consideration, I will ask you whether or not plaintiff's Exhibit No. 8 discloses a crossing of the Rainbow lode, as you designate it, by the Jersey Blue?

The Court: Are you asking if this exhibit discloses the crossing?

Mr. Kremer: Yes, sir.

A. It does not.

Q. I am referring to the pencil mark which I will ask you to mark H. W., that blue pencil mark immediately opposite the initials H. W. You just placed that blue mark across the red, did you not in your examination?

A. I did, to show the probable position of a displaced segment of the Jersey Blue vein. It is not any portion of Plaintiff's Exhibit 8 as presented.

Q. That is, either at the time of its presentation or now, that is merely——

A. That is merely my opinion, as expressed on the diagram.

Q. Is there anything in the ground at the point where you placed that mark to justify that conclusion that such a condition exists as you have depicted by the mark?

A. The ground is so badly broken that it cannot be positively asserted that this block lies at that particular place, but it is very probable that the opening of this a little bit would show that block, because so generally known is the effect of displacement by

601 those faults developed throughout the district, that any geologist who has been working here is confident that he ought, by slight development, to prove it; in other words, it is not an isolated case, but there are so many cases that the evidence becomes convincing.

Q. Doctor, you would have the very picture that plaintiff's Exhibit 8 purports to portray without the marking of that blue mark there, would you not, if the Jersey Blue had been faulted by the Black Rock, even though there was no attempted crossing?

A. We would hardly expect to get that condition here unless the Jersey Blue crossed and was independent of the Rainbow lode. I have represented the Jersey Blue vein in blue on this diagram, and as an independent and individual vein. That is based upon my observation throughout the property, and therefore I do not consider that it is possible that that condition could be represented as true, if this were a branch of the Rainbow lode, because from my observations I conclude that it is not a branch of the Rainbow.

Q. I understand; that is your theory.

A. It is not a theory; it is a fact.

Q. I am speaking of the physical condition?

A. Well, if there was a block of faulted material in here, then the Jersey Blue is related to the Rainbow.

Q. Well, is there?

A. I think it quite probable.

602 Q. Have you anything in your notes to show that such a condition would be indicated at that point?

A. I have just said that the last time I was there, the amount of clay and the smearing over of the material from shots was such that it was impossible to say positively that it was there.

Q. How about the first time you were there?

A. Well, the first time I was there it was the same way. I was not there when it was fresh enough to be absolutely sure.

Q. Now, Doctor, in passing, I will ask you to please read your notes upon the point that I have indicated; just what that development is?

A. At that point I find the two strands of the Black Rock fault, or rather the three strands, for the northern one is multiple—as indicated on this map, and at this point here——

Q. Indicate it in some way?

A. Well, approximately it is indicated by the end of this H. W.—I find the ground so broken that it is impossible to tell positively whether there was or was not a portion of that in there. My notes are to the effect that it is not possible to distinguish one way or the other.

Q. Your notes so read, do they?

A. My notes indicate that it is crushed ground.

Q. And they read that it is impossible to distinguish one from the other?

A. My notes read that it is badly crushed ground.

603 Q. Did you detect the Jersey Blue in the Pyle vein raise when you inspected the raise with Senator Clark, between the 1200, the 1100, and the 1000?

A. In the lower portions of that raise there was a clay slip or a clay seam encountered, which we now know to be the Jersey Blue, but which at that time I did not recognize as the Jersey Blue, because it was not known to me at least that the Jersey Blue vein could be identified south of the Black Rock fault.

Q. At what point did you detect it?

A. Why, my recollection is that it was about half way between the 1200 and the 1100, and that the clay continued upward through several sets.

Q. Just at that particular point, if you can state it more definitely?

A. Well, the model conforms closely to my recollection of it, as being approximately or just below the sill of the 1100, down to the stopes of the 1200.

Q. Have you a section of that?

A. No, I haven't a section of that.

Q. Have you notes of that examination?

A. No; that was made on some blue print notes which I have not with me. I mean to say that I had no note book at that time, and expecting to come back and make a detailed observation there of it set by set, when I came back the raise was closed.

Q. What year was that in?

A. It was in 1911.

604 Q. And you have been engaged continuously or almost continuously on this case?

A. I have, and I have been hoping every time I came here that that raise would be cleaned out, but I have been disappointed.

Q. And you have not ordered that to be cleaned *cut* so you could examine it?

A. I am not allowed to order anything.

Q. Well, you have not requested?

A. I have suggested that the raise be cleaned out.

Q. To whom did you make that suggestion?

A. As I recall it, it was to Mr. Pyle.

Q. When?

A. Perhaps a year ago.

Q. And it was not done?

A. As far as I know it was not done.

Q. And you have visited the place since?

A. I have visited the place at least a dozen times since, hoping that it might be opened up, and it was not.

Q. Now, doctor, I will ask you to describe from your notes what you saw last night in the crosscut upon the 1700 foot level of the Elm Orlu?

A. On the plan map exhibit 26, will I indicate the distance here so that you can see it?

Q. I think that will be just as well.

(Witness started to draw on exhibit 26.)

Q. Doctor, can't you simply read your notes into the record

605 on that, and then you can draw it on there later?

A. The face of the crosscut at the present time is a certain distance northeast of station 18, and in order to be precise I wanted to put station 18 on there.

Q. Now, if you will read your notes into the record, it will be just as good as a long examination?

A. The length of the crosscut last night was 176 feet beyond station 18, and about eighteen feet back of that breast is a strong vein of quartz and manganese, which is characterized by considerable water and it is cut by a slip. For 23 feet back from that vein in a direction toward the Elm Orlu shaft, that is to say southwesterly, there is 23 feet of granite, devoid of mineralization or of vein structure. There is then encountered a clay slip with a strike of north 65° W., and to the southwest of that clay strip there is four feet of vein matter, together with a second clay slip with a parallel strike of North sixty to sixty-five west, varying slightly, and a southerly dip of eighty degrees. At that point mineralization appears alongside of it, but that is immediately outside of the clay slip in the roof of the crosscut. Going down on the side of the crosscut toward the floor that mineralization increases until it is about eight inches wide, consisting of quartz and manganese with some sphalerite.

What mineralization can be seen on both sides of the cross-
606 cut and on the northerly side of the crosscut immediately outside of the more northerly strip, there is considerable pink manganese showing.

Q. What do you mean by considerable pink manganese?

A. Why, from three to four inches, but varying, so that in places it would be four inches, and higher up it would be two inches, and again it would open out a little. It does not, however, cross over the roof as a persistent strong streak or band of mineralization. I might add that manganese oftentimes is erratic in its occurrence; sometimes it will come quite pure and then it will pass away and quartz will replace it.

Q. Proceed?

A. My notes say that the body of this material between the two clay slips is crushed and pyritized having the typical fault character, and that the clay slip contains fragments more or less rounded, and is a typical fault clay, such as we have shown throughout the Jersey Blue and many of the other fault veins. South of that point there is no vein of any consequence, in fact nothing but joint planes until we come to a point fifteen feet beyond station 18, where another vein is cut. This vein is from five to six feet wide. Do you want the details all the way down?

Q. I was going to ask you if your notes contained all of that?

A. Yes, they do, but I don't know that that is pertinent to this inquiry.

Q. Well, go ahead and describe it anyway?

607 A. At the point fifteen feet to the northeast of station 18 there is a vein, or rather two veins, dipping in opposite directions, with a course of north 75 west and a dip to the south of 74°. It is five or six feet wide and consists of quartz and manganese. Still further to the southerly and at a point 30 feet to the southwest of station 18 another quartz and manganese vein is cut which has a course of N. 80 W., and a dip at one section of 65° to the north and the clay seam has a slight dip of 45° to the south. From there down to the station the veins are unimportant and quite small, there being a six inch stringer at one point, and a two inch clay seam at another, and at a point near station 17 shown on the map, there being three northwest small slips of clay.

Q. Now, do I understand, doctor, that you have completed your notes upon the entire crosscut?

A. I have.

Q. As I understand you then, you have extended all along the crosscut and in so far as mineralization of the veins are concerned, from its beginning to its present end?

A. Beyond, of course, the copper vein indicated by the drift 1202.

Q. Everythng to the north of that copper vein?

A. Yes, sir.

Q. Now, is this crosscut still being driven?

A. Why, I understand that they hoped to be able to shoot
608 this morning, but at the time last night the muck was extending back fifteen feet from the face and about as high as a

man's waist and higher, and there was no way of disposing of it and they were carting much of it back to the station and dumping it upon the station floor. Now, whether they have been able to complete it or not, I do not know

Q. Do I understand that the crosscut, with the muck in the position where it was, is at an end or will continue?

A. No, it will be continued as I understand it.

Q. Now, doctor, please turn to plaintiff's exhibit 26, using your notes and place upon this crosscut every vein that you have described, indicating the strike and dip of each of these veins; also indicate upon the map immediately opposite the point at which you indicate the vein, the width of the vein, if you please?

Mr. Gray: He has just read that all into the record, and if you want it placed on there I will have the draftsman do it.

Mr. Kremer: This is cross examination and I have a perfect right to have it. It will be easily distinguished and will be distinctly marked and it will only take a few minutes. While the discourse was long the veins were few.

The Court: Can you place it on there?

A. Yes, I can place it.

Mr. Kremer: Do so.

The Court: I was just observing your model. Why is
609 there such a lack of workings shown in the model in the upper levels? I think your plan map showed the same thing. Were there no workings up above?

Mr. Gray: Your honor will recollect down to the 300 foot level no one had been except Senator Clark. Now, between the 100 and the 300 these workings have not been opened up. I would not say that they are caved, but we have not opened them or attempted to open them below the 100 foot level of the Elm Orlu. Here is the old 100 foot level of the Elm Orlu. It was worked by Senator Clark down to the 300 foot level when he stopped mining, he says because he couldn't make it pay. Now, the 500 was worked up seven floors, above the 500, and there they couldn't make it pay. We felt that the continuity was sufficiently established without what we felt was a needless expenditure.

The Court: I think under the circumstances we will suspend now and the doctor will have his draft completed in the morning, no doubt. We will suspend until 10:00 o'clock tomorrow morning.

Whereupon an adjournment was taken until 10:00 o'clock, Friday, October 22nd, 1915.

610 Friday, October 22, 1915—10 o'clock a. m.

Trial resumed pursuant to adjournment.

WALTER HARVEY WEED resumed the stand for further

Cross-examination:

The Witness: Your honor, before starting the testimony, I would like to make a slight correction in my testimony, which I read over last night.

The Court: Very well.

The Witness: I find that in speaking of the Black Rock tunnel No. 1 east, I have spoken of the branch of the Jersey Blue going off in a northeasterly direction, being cut off by a northwest slip. I was misled by the map, Exhibit 8, which has several slips on it which are not in my note books, and by reference to my note book, I find that this slip simply plays out and feathers out.

Q. This vein?

A. This branch of the Jersey Blue. At the time that was being driven I was there, and I was hunting around to see whether that played out so that they could not follow it, and it played out and that crosscut down here a little way apparently was not far enough to cut it, so there was nothing going forward. So my notes do not quite agree with this map, in that they do not show this slip going here and here.

Q. You say the vein plays out?

A. It is petering out; it is very small in the face, and
611 there is no sign of it here, and no sign of that slip there.

By Mr. Gray:

Q. That is not very clear; here and here will not look well in the record; can't you designate the points?

A. I will say that at station 787, the vein becomes very small, and cannot be followed, and that at station 199 I find no northwest slip going through, and I find nothing but barren granite through this portion here.

Cross-examination (resumed).

By Mr. Kremer:

Q. Do I understand that the map is wrong?

A. I simply say that my notes do not give any of these slips that I have mentioned.

Q. When you say that, do you mean that they do or do not exist on the map?

A. I say that I did not find them there; I find nothing but barren granite from this crosscut 22 eastward to beyond the station 800.

Q. Do you know who directed the placing of the geology upon that map?

A. I do not.
Q. Did you have anything to do with it?
A. I checked up most of it, but that evidently escaped me.
Q. You mentioned the vein shown in the No. 1 east; what is that a forking or a branching of the major vein immediately below?
612 A. It appears to be a branching of what we call the Jersey Blue vein, one of the northerly branches which is a splitting or a spur, which fades out going eastward.
Q. An offshoot?
A. A slight offshoot, yes.
Q. Immediately below it, what is this?
A. That is another small one which fades out. The branch which passes immediately south of transit point 786.
Q. And that is an offshoot or a branch?
A. That is a small offshoot, or branch. There is apparently a continuous wall going through here, which was apparently followed in the mining on that branch, that branch which passes almost through 796.
Q. And the other one immediately below; designate that in some way?
A. The clay slip which passes through station 1114 and runs in a general easterly or northeasterly direction from station 1114 almost to station 836, where it appears to be cut off by the clay wall of the Jersey Blue.
Q. That mineralization, as I understand you, going northeasterly fades off into the country rock?
A. This slip here does not fade off into the country rock; it simply narrows until it is so small that it is practically a mere slip.
Q. But the others?
A. The others do the same thing.
613 Q. Now, Doctor, your testimony yesterday corresponded with the map; that is to say, your testimony was in conformity with the map?
A. Except in this one point I have nothing to correct.
Q. But yesterday you testified with reference to that one point as it was shown upon the map; that is true, is it not?
A. It is quite true. I was misled by the map, not having my note book in my hand.
Q. Are you testifying now in this case—I am not saying this argumentatively at all, but I want to get at it—are you testifying in this case from the standpoint of what you see upon these exhibits before you?
A. No, sir.
Q. Or what you observed yourself?
A. What I myself observed, but sometimes, without one's notes in hand, it is difficult to remember. I had checked the map, and I supposed it was correct.

The Court: Is there likely to be an issue between you up in that section where it goes?

Mr. Kremer: Yes, your honor, it may become somewhat important.

The Court: Proceed.

Q. If these northwest faults exist in the ground as indicated upon Plaintiff's Exhibit 8, would you say that they are a part of the northwest-southeast system?

614 Mr. Gray: I object to that, if he says he has not seen it it will be very difficult to say what they are.

Mr. Kremer: I am basing it solely upon the exhibits here in evidence.

The Court: Read the question.

Mr. Kremer: I will repeat it.

Q. If these northwest veins or slips or faults which are shown upon plaintiff's exhibit 8 do exist at the points indicated upon said exhibit, of what vein system would you, as a geologist, say they were a part?

A. If there were slips, clay slips running in the direction indicated on the map from station 199 and station 800, that might be very recent faulting due to movement of the ground, or that might be of an old member of what might possibly be called a sympathetic fracture, connected with the northwest series. But, in as much as I did not find them there and have marked it all "granite" without any slips, I cannot feel any confidence in a hy-othetical question that cannot exist.

Q. Doctor, I am not asking you now from your own observation, I am asking you if you were called as a geologist to interpret the map that is before you, what system would you say that these veins belong to, from their appearance upon the map?

The Court: Are they colored blue also?

A. They are colored blue.

The Court: That naturally follows.

Mr. Kremer: All of these he says are in the northwest-southeast district.

615 The Court: I think the witness has given you as good an answer as he can under the circumstances. He says he has not seen them there. I do not understand from the witness whether he says that they are not there or that his search was not sufficient to enable him to note the fact that they are there.

A. I made a very thorough search of that section because I regard it as critical ground, from this point immediately above the 1114 through 800 and through to 843 transit point and I found but one slip, which is the one marked in heavy blue ink at a point twelve feet east of transit point 800.

Mr. Kremer: How wide is that?

A. It is marked here as a mere slip, with a dip of 76 degrees southerly.

Q. I do not know what you mean by "a mere slip," doctor——

The Court: Before we come to that—tell us what system, if any, you would consider that slip belonging to?

A. This slip coming through here connects with one through here and is probably a crack of the ground formed at the time when the blue vein system was formed in the downward movement the wall of the ground alongside of this movement would crack open in a short seam.

Mr. Kremer: That is what I was going to ask you after the others, so you needn't answer the question I have asked you.

616 Q. Now, doctor, turning to your 1700 foot level, I think that is where we left off last night, you have placed upon plaintiff's exhibit 26 all that is shown in the 1701 crosscut, have you, doctor?

A. I have all that I have observed in that crosscut.

Q. Which of the several veins or veinlet shown in the 1701 crosscut do you characterize as the Jersey Blue?

A. The one which passes through the crosscut at a point 125 feet to the northeast of station 18 as marked on the map, transit point 18.

Q. Why do you color that with red on either side?

A. Because outside the center fault material there is a streak of quartz with manganese and galena and zinc sulphide, which is from a few inches up to eight inches wide in going from the roof downward to the floor of the crosscut. Outside of that red streak there is a further thickness of ten inches of mashed pyritized granite to the ultimate wall on the southwest, giving a total thickness to the vein of about five feet.

Q. And what is indicated by the red immediately northeast of that vein you have last referred to?

A. The red at the extreme end of the crosscut represents a mass of manganese and quartz—undoubted vein material—which was exposed for a width of eighteen feet.

617 Q. Where?

A. From the point 153 feet from station 18 to the face, or 169 feet from station 18—or 170, I am not sure.

The Court: Has all of this been opened up since Dr. Irving testified?

A. Not since he testified, but since he has been down there. The work has been pushed forward as rapidly as it could, I understand, since the engine broke down.

Mr. Gray:

Q. When did you see it, may I ask?
A. When did I see it?
Q. Yes.
A. Day before yesterday—no, night before last.

Mr. Kremer:

Q. When you saw it did you communicate it to Dr. Irving?
A. No.
Q. Didn't you discuss this matter with him?
A. I did not.

Q. Had no general discussion among yourselves with reference to what was being disclosed in the 701 crosscut?

A. Yes, Mr. Winchell and I went down together and visited the place in company.

Q. And how many feet below the present extension of 1701 crosscut is the so-called Jersey Blue vein—you understand me?

A. How many feet below the 1701?

Q. No, how many feet beyond the present extension; that
618 is how many feet northwesterly from the present face of the 1701 crosscut is this vein?

The Court: If they are still working——

Mr. Kremer: At the time he saw it.

A. It scaled 42 feet southwest of the face to the north wall of the vein.

Q. At the time you visited it, when was that?

A. The night of October 18th or 19th, I have forgotten which, I don't specify.

Q. Well, at that time, two days ago, the crosscut as I understand you had proceeded 41 feet beyond the point where you claim that the Jersey Blue vein was cut?

A. Forty-one feet, yes.

Q. How many feet do they make a day in this crosscut?

A. I can't tell you.

Q. Well, as a mining geologist, what would you say would be your judgment from the character of the ground and the conditions under which the men were working?

A. I think they would make ten feet a day easily.

Q. Do you find the so-called Jersey Blue vein that you cut upon the 1701 crosscut upon any other exhibits of the plaintiff showing the lower levels?

A. It is on our 1500 crosscut, 1500 foot workings of the Elm Orlu mine.

Q. The red indicated northeast of the so-called Jersey Blue, did you find any faulting material there?

619 A. There was a fault—a slickenside with no clay in it and a very heavy flow of water on the extreme face as I saw it, a hard polished face of manganese and quartz dipping 65° to the south and running northwest.

Q. Did you find any part of the Black Rock fault in this vicinity, in the vicinity of the Rainbow lode?

A. I didn't; not that I could recognize as such.

Q. You would recognize it if you saw it, of course, doctor?

A. Oh, yes.

Q. But you did find some fault material there, you found a slickenside?

A. I found a slickenside and water but no clay and no fault material.

Q. You didn't find that runny fault material that you referred to in the early part of your testimony?

A. No, I did not.

Q. Did you find that anywhere down here?

A. I found it in the second vein back from the face, the one which I have spoken of as probably the Jersey Blue?

Q. You have—you found that runny——

A. I found that there was clay there that runs, and there is a soft mashed material which caves down easily, if it is left open undoubtedly will cave down more.

Q. That is true of almost all mine work, isn't it?

620 A. Oh, no, this is harder here in this wall; stands much better.

Q. Where did you find the Black Rock fault in this crosscut 1701?

A. It is not exposed in this crosscut.

Q. Projecting the Black Rock fault to the point where it is indicated to the west end of it, as indicated upon plaintiff's exhibit 26, from thence westerly, where would you expect to find it?

A. I would expect to find it about the position indicated by my pencil, which is some 25 or 30 feet beyond station 15 on drift 1702 of plaintiff's exhibit 26.

Q. You believe that the Black Rock fault proceeds southwesterly and crosses, consequently, the south side line of the Elm Orlu?

A. We know from the development of the levels that it does that. It shows on the 1600 here; cuts off this same vein on the 1600 Elm Orlu.

Q. How far west is it on the Elm Orlu claim, turning to another of your exhibits, the one above, the 1400 I guess?

A. 1600 will answer. Plaintiff's exhibit 25 showing the 1600 foot level of the Elm Orlu and the 1500 foot level of the Black Rock shows the cut—shows the work of the development by drift 1602 cut off by the Black Rock fault at a point quite close to transit point 10 as shown on that drift.

Q. Where would the Black Rock fault go out over the

621 south side line of the Elm Orlu on that level as indicated on Exhibit 25?

A. If the fault continued with unchanged course and none of the slight deviations and variations which it shows elsewhere, it would cross the south side line of the Elm Orlu claim at a point 187 feet east of the extreme south west corner of the Elm Orlu claim.

Q. In your judgment does it so proceed?

A. In my judgment the course of the Black Rock fault for any considerable distance is likely to vary slightly, and it is unfair to say that the Black Rock fault will pass through any one definite point; it might be ten or twenty feet farther to one side or the other.

Q. You think that that, however, would be its approximate course?

A. Approximate.

Q. What did you find in the crosscut shown upon plaintiff's Exhibit No. 25, designated as 1601 crosscut north of which you have designated as your copper vein?

A. I find no veins at all.

Q. How far did you proceed?

A. Why, I went up to about half way through there, where there

was debris and refuse in the way. I had gone out previously to the extreme face at the time when the work was freshly done, and found nothing but a few slips.

Q. Now, without turning back to the other exhibits, you
622 have in mind the veins shown in 1701 crosscut, veins or veinlets or slips or whatever they may be; what is the course or strike of those veins that you find in 1701 crosscut; I don't want it in detail; I want it generally?

A. Well, it is impossible to give them generally, because some of them are northwest and some of them are east and west.

Q. Well, I thought that you had classified them altogether, and I thought that was very apparent.

A. They belong to two systems, the so-called east and west system and the northwest system. The vein matter shown in the face here is given a direction rather northwest, because the fault fractures going through it run in that direction; the banding, however, of the quartz is more nearly easterly and westerly. The one shown at the point fifteen feet beyond station 18 has a course of N. 75° W., which conforms closely to our so-called east and west system.

Q. How large is that vein?

A. Five to six feet.

Q. What is in it?

A. Quartz and manganese and pyrites.

Q. How wide is the vein which you designate as the Jersey Blue?

A. Five feet.

Q. What is in that?

A. A central mass of clay and pyritized granite, flanked by clay faults, with outside of one of the clay faults eight inches of
623 low ore, and outside of that again a final wall of clay.

Q. How wide is the vein which you characterize I believe as part of the Rainbow?

A. I find the vein in the face which may be part of the Rainbow has a width as cut of 18 feet, and the face is still in the same material.

Q. What is that material?

A. Quartz and manganese.

Q. Is there any valuable metal present there; what character of ore would it be; silver?

A. Why, it is probably zinc ore; the material is so fine grained that I did not put it under the microscope.

Q. Isn't it of such character that you could identify it as valuable or merchantable or nonmerchantable ore?

A. I should consider it part of the Rainbow system, and as indicative of the ore beyond, but I would not consider it commercial ore.

By the Court:

Q. What kind of manganese do you find in that?

A. Rhodonite, the silicate of manganese, with a mixture here and there of rhodochrosite, the carbonates.

Q. What is the color?

A. Pink.

By Mr. Kremer:

Q. What is this vein that you have described as being
624 five feet wide, the one which is 15 feet from station 18?

A. It is a very wet vein which dips to the south, and cuts off a quartz vein going in an opposite direction.

Q. Of what system is that a part?

A. That is part of the east and west system, and has a strike of N. 75° W.

Q. What is the strike of the Jersey Blue?

A. As I have it, the strike of the Jersey Blue is N. 65° W.

Q. Can you identify the vein north 75 west as being a portion of any other vein that you have encountered in that ground?

A. It is impossible to correlate that small vein with anything above, because the 1600 does not reach out far enough to cut it.

Q. When you say a small vein, you don't want to be understood as designating that as a small vein in itself do you?

A. Not necessarily; it is a hard quartz vein with no clay.

Q. And it is part of the east and west system, you say?

A. Part of the east and west system.

Q. And the one immediately below it, to the southwest of that, I should say south of station 18 about 18 or 20 feet?

A. Approximately 25 feet south. That vein has two veins,
625 one a hard quartz veinlet running to the northwest, and another a N. 80° W. vein which has a southerly dip of 45 degrees, and has cut off the other vein, the one running northwest.

Q. How wide is that vein?

A. I have got it 12 inches.

Q. Of what is that composed?

A. The fault itself is composed of clay material and attrition material derived from the quartz vein running into it, and from the granite walls.

Q. Do you find manganese there as you do in all the others, pink manganese?

A. There is a little manganese in the quartz vein, but this fault material is mostly clay.

Q. What is the one immediately southwest of that?

A. Immediately southwest of that is a very small quartz and manganese veinlet running across the drift.

Q. Of what systems?

A. Why, I have not characterized it as of any system; I have simply shown it as it exists in the ground.

Q. What system do you believe it to be a part of; it is represented in red?

A. It is colored in red because it has no fault material, but is quartz and manganese, and following the general principle, I have colored it in red.

Q. And the one below?

A. The one below is a fault vein of about two inches, the
626 course of which is N. 50° W. and the dip 81° to the southwest

Q. Then you find three veins or veinlets or faults which

ever you choose to characterize them, near each other and running southwest?

A. I find three small clay slips which are mere slips, one of them marked as half an inch and the other probably less than that, which I have marked because they were in the ground and it seemed advisable to put them in. They are very small, and of no significance, being in the granite.

Q. They are part of the northwest system?

A. They are northwest cracks.

Q. Do you find anything in crosscut 1701 that you do not find in crosscut 1501 upon Exhibit 23?

A. I find some small slips between the station of the shafts on the 1500 Elm Orlu on Plaintiff's Exhibit 23 and the copper vein shown in 1503 drift. I find several small veins.

Q. They are not upon this map?

A. No, they were so small that I presumed it was not considered advisable.

Q. How wide is the largest one?

A. Well, I have got 12 inches here of a vein down near the station, and six inches, and several other slips.

Q. What are the others; how wide are they?

A. Well, I have not noted their thickness.

627 Q. Do you encounter anything that you can identify as that five foot vein that you found on 1701?

A. There is a vein shown at approximately 245 feet from the station that might be it. It brings it so close to 1503 that I am not sure about that.

Q. What brings it so close?

A. The distance.

Q. What do your notes show that vein to be?

A. I show some quartz running at right angles to the course of the crosscut, back a little distance from 1503 drift.

Q. How much quartz?

A. The amount of quartz is not mentioned here.

Q. Have you any recollection of that?

A. My recollection is that it is about two or three feet.

Q. And you have not shown that upon this cross-cut?

A. I did not draw this crosscut. I have it in my note book in red, however.

Q. You have consulted with the gentleman who had under his direction the making of these exhibits?

A. I checked up most of these exhibits and found that the features which I checked were correct, but——

Q. Did you check up Plaintiff's Exhibit 23?

A. I checked up Exhibit 23 in this portion, but I did not go through this part of it to see that every little insignificant slip was put on there.

Q. Doctor, do you call this vein that you have just de-

628 scribed as containing several feet of quartz an insignificant slip?

A. I don't know that that would be an insignificant slip, but it did

not appear to me necessary to insist on every bit of a slip being put on that portion of it.

Q. Naturally. Now, you did not check to see that it was put on Plaintiff's Exhibit 23?

A. No, I did not; I did not pay any attention to this portion here; I was looking at the more critical portion out underneath the crosscut 1501. These maps were not finished until the morning when they were brought into court.

Q. Doctor, I don't want unnecessarily to consume the time of the court, but will you undertake to have the geology shown in crosscut 1501, as specified in your notes, placed upon this Exhibit 23?

A. I will, sir.

Q. During recess?

A. Yes, I will do it at the noon recess.

Q. What other vein did you find in there?

A. Beyond drift 1503 I found a few small slips in about the middle, at the point between 1503 drift and 1504 drift, which I can also put on if you wish.

Q. Yes, it would be as well to put it on, since you have it all on 1702.

A. Yes; to save time during the noon hour I can plat the whole crosscut.

Q. I think that would be the proper thing, to enlighten the court. That crosscut as there depicted would indicate that there is no

629 vein other than the copper vein going through that crosscut, would it not?

A. It would indicate that there was no important vein other than the copper vein.

Q. What is the width of that copper vein?

A. As indicated on the map or as I find it?

Q. Well, if there is any discrepancy, let us have that too; the vein as indicated on the map in the crosscut is what?

A. Seven feet.

Q. And how do you find it in your notes?

A. I find it varies in width as shown in the drift and in the roof.

Q. But I am speaking at the point of the crosscut?

A. At the point of the crosscut it is five or six feet.

Q. And is shown as seven upon the map?

A. It is shown as seven upon the map if you include the two heavy deep lines which bound it.

Q. And the other insignificant vein as I understand you, was also five feet?

A. Well, the insignificant vein was apparently irregular.

Q. All right, Doctor, let us pass to the 1400 Elm Orlu. Now, referring to Plaintiff's Exhibit 22, and the 1401 crosscut shown thereon, that is a crosscut driven along the same course on the upper level as the crosscuts we have recently been referring to upon the lower level?

630 A. Very nearly. That can be seen on the model; there is a slight deviation.

Q. Approximately so though?

A. Yes.

Q. Now, what veins, slips or veinlets or faults do you find in that crosscut?

A. I find in the first place the so-called copper vein exposed in drift 1402; I find a fault vein marked on crosscut 1401——

Q. Just at that point, what is the significance of the violet color upon the map; I notice that that is in violet?

A. This line which you call violet is simply an intense blue made by the ink which is used, and the paler blue is shading with a pencil.

Q. No, but I mean where you distinguish the violet from the blue, has it any geological significance?

A. It has no significance; the outline of it bounding these veins is marked in blue ink which you have designated violet.

Q. I notice upon Plaintiff's Exhibit 4 that you have here some violet coloring. What is that?

A. On Plaintiff's Exhibit 4 we have a violet coloring.

Q. What is the significance of it?

A. It is simply to differentiate that particular vein for reference in the testimony, I suppose. This color is not the same color that has been used on Plaintiff's Exhibit 22.

Q. But on this map it is to differentiate the vein which I
631 am now pointing to from the northwest system?

Mr. Gray: Are you testing Mr. Weed's recollection about this?

Mr. Kremer: No, I want to understand.

Mr. Gray: Well, I will explain that the violet is used on these maps to show that it is something which we are not sure of.

Mr. Kremer: Then when we see the violet——

Mr. Gray: There is doubt.

Mr. Kremer: As I understand, that does not apply to the plan maps here?

Mr. Gray: It does apply to the plan maps; where shown in violet. The outlines of the stopes or the outlines of anything appearing in a deeper blue, of course that does not mean anything.

The Witness: There is no violet here; it is Higgins' blue ink. Here is some violet over here (indicating).

Q. Now, what else do you find, vein, veinlet, fault or fissure, in crosscut 1401 as shown upon Exhibit 22?

A. I find at a point near the south side line of the Jersey Blue claim a northwest fracture in my note book, as indicated on here, with a course of north 25 west and a dip to the northeast of 75 degrees.

Q. Where do you find that?

A. At the point indicated by the blue line on crosscut 1401 of the Elm Orlu mine.

Q. What else do you find in there?

632 A. I find here a small vein near the shaft, and I find some aplite over here.

Q. How small a vein?

A. Its extreme width is five feet, but it is cut by faults into fragments so that it would be hard to show it on here properly.

Q. How many feet?

A. Between the two faults it is five feet.

Q. Then the width of the copper vein shown upon Plaintiff's Exhibit 22 at the crosscut is what?

A. Seventeen feet.

Q. What do your notes show it to be?

A. Eighteen feet.

Q. And what other vein besides the five foot vein which does not appear here did you find, and those previously described?

A. I found two small mineralized seams of black quartz in aplite at a point about midway between the station and the drift 1402; I found an eighteen inch stringer of quartz a few feet beyond the vein shown on drift 1204, a stringer which may come from this vein, as it is heading towards it; I also found the fault which is shown on the map with its course of north 70 to north 50 west. I did not find—I then found a small hard quartz vein running through north 44° west a few inches in vein approximately at the position shown by transit point 5.

Q. How wide was that?

A. Four inches.

633 Q. And how wide is the one between this and the copper vein?

A. You mean down here?

Q. Yes, as shown by your notes?

A. That is eighteen inches. I think I found a small fault running N. 10° W. and from this point—it would probably be more satisfactory if these were plotted.

Q. I was just going to ask you, to save time, if you would not at recess have these all plotted upon Exhibit 22?

A. All right, sir.

Q. Now, we will have the 400 foot, the Black Rock, and I then will have concluded with this portion of the examination. Are you familiar with crosscut 1414 as shown upon Plaintiff's Exhibit 24?

A. I am familiar with the crosscut marked 1414 on Plaintiff's Exhibit 24.

Q. Are you also familiar with the crosscut 1410 as shown upon Plaintiff's Exhibit 24?

A. I have observed that crosscut marked on Plaintiff's Exhibit 24 and found underground a board bearing that mark, 1414.

Q. Do you know who nailed it there; it wouldn't make any difference in this lawsuit?

A. Makes this difference—it misled me—I was looking for 1414 and found this did not agree with 1414.

Q. Then, so as to relieve you of any possibility of confusion, or any of your other witnesses, we will designate these crosscuts;

634 first, the one to the extreme west end of the Black Rock upon this level and the second one the crosscut 175 feet east thereof. Referring to the crosscut in the extreme western end of the Black Rock claim upon this level I will ask you to state what you found in this crosscut?

A. I found a slip sideways between transit points 449 and 450, a

small clay slip running N. 85° W. I might add first that I found vein material, quartz and ore, from the sill floor southerly to the extreme face of the crosscut, with a small fault fissure or vein, small vein running about midway between the two transit points marked on crosscut 1414. And this clay slip had a course of 80° west. I found another wall to the vein at the extreme south end of the crosscut, the wall having a course of N. 75° W., and a southerly dip of 85°.

Q. North 75; are you sure of that?

A. It is so marked.

Q. Of course you are relying upon your memorandum there?

A. Yes.

Q. And immediately north of this did you find another fault vein or veinlet having a similar dip?

A. Immediately north you mean, within ten feet?

Q. Within ten or twenty feet?

A. Please be a little more specific. Immediately north of the breast of drift 1414 did I find another?

Q. The breast as you have described it?

A. I have already stated that midway between stations 449
635 and 450 I found a clay slip cutting through the Rainbow lode.

Q. What was the dip of that?

A. The dip is not given in my notes.

Q. What was the course?

A. The course is N. 80 W.

Q. Did you find anything else in there?

A. I found nothing else but strong bands of quartz belonging to the Rainbow lode—all quartz right straight through from the breast to the opposite wall except in the center where I mentioned the fault material marked on the map as what we correlate with the Jersey Blue vein.

Q. You call all of this the Rainbow lode?

A. I call all of that the Rainbow lode.

Q. Now, with reference to the crosscut 175 feet east of the one last referred to, what did you find in that crosscut?

A. I found on the extreme face a strong north 50° W. fault slip which was wet and in granite. Perhaps I might better say I found the Rainbow ledge material for a distance of 31 feet south of transit point 444, a point, however, which is not marked on this map.

Q. If you are going to refer to it, you better indicate it in some way.

A. I will make it 61 feet south of transit point 445, which is marked on this map. South of that wall of the Rainbow lode I found a few feet of granite which is altered and is entirely in-
636 cluded as part of the ledge matter on this map, but I have differentiated between the solid quartz and altered granite. Between the walls mentioned by myself and the main sill floor I found no slips, no bands worthy of mentioning in the wall of the Jersey Blue vein.

Q. And you call all of that the Rainbow lode, all shown on that crosscut?

A. I call all of that ledge material which I have correlated as part of the Rainbow lode.

Q. Is there a portion of the Rainbow lode to the south, immediately to the south of the Rainbow lode as you describe it just to the extreme west end of Plaintiff's Exhibit 24?

A. If you permit me to refer to the model.

Q. You may refer to the model but I wish you would answer my question yes or no, and then refer to it?

A. There is none shown on that map and therefore it is impossible to say.

Q. Well, do you know without looking at a map?

A. It is a question of correlation. The Rainbow lode as developed on this map and on the map showing the 1500 foot Elm Orlu shows a slight section of quartz in this little segment here, which might or might not be correlated by this, by a slight displacement, but I should say as far as my recollection is concerned, there is no Rainbow lode of—in that horizon south of that drift.

637 Q. You would say with that little exception here that there is none, and that would be doubtful?

A. There is none that I have correlated with the Rainbow lode at that horizon.

Q. You stated, I believe, in the early part of your examination that the Black Rock fault was a strike fault?

A. No.

Q. Well, is it or is it not?

A. In places it is a strike fault, yes. It is shown on Plaintiff's Exhibit 4 as running for a long distance following the Rainbow lode.

Q. Did you not state it was a strike fault following along the course of the Rainbow lode?

A. In part of its course.

Q. Only part.

A. Only in part, because if you follow that same fracture to the west it departs from it and follows other veins.

Q. You don't, then, find the Black Rock fault, as I interpret it, in any portion of the west end of the Black Rock beyond a point 35 feet to the west of the transit point 37 on drift 1402?

A. Not on the 1400-foot level of the Black Rock mine.

Q. Where do you find it in any portion of the Black Rock upon levels, if at all?

A. That is the extreme westerly point at which I find the 638 Black Rock fault developed in the Black Rock workings.

The Court:

Q. In that 1700-foot crosscut you found eighteen feet of material at the extreme end as you saw it which I think you assumed to say, is of the Rainbow vein?

A. Type.

The Court:

Q. Was there enough of it exposed to determine the dip there?
A. The walls were made by cross fractures and the dip could not be determined closely. It was apparently somewhere to the north with an easterly and westerly strike to the banding, judging only from the banding of the ma-ganese and the quartz.

The Court:

Q. Then the small veins toward the beginning of that crosscut, next to this eighteen foot mass, which you assumed to consider to be the Jersey Blue, was there enough of that exposed to determine?
A. Oh, yes there were good sharp walls and the banding of the vein was perpendicular to the walls.
Q. And what was the general course?
A. The general course was to the northwest, and the dip——
The Court: I mean the general course of the dip?
A. The general dip was to the south, 75 to 80 degrees as the walls varied going from the roof down to the floor.

639 Mr. Kremer:

Q. Doctor, have you been through the raise in the Black Rock mine known as the Clark raise from the 1300-foot Black Rock to the Black Rock tunnel?
A. I have been through the Clark raise from—what level did you ask me?
Q. 1300 foot Black Rock to the Black Rock tunnel; in other words from the bottom to the top?
A. I have.
Q. Do you remember when the first portion of that raise was started?
A. Why, I don't remember the date.
Q. Approximately the date, doctor?
A. I should say approximately 1911 but I don't recall the precise date.
Q. From what point was it started?
A. My recollection is it started from the point on the 1200 foot level but I am not sure?
Q. 1200 what?
A. No, the 1300 of the Elm Orlu.
Q. Who started it?
A. The Elm Orlu company I presume. There were Elm Orlu men working there when I went up?
Q. Did you watch its progress?
A. I went up on different occasions.
Q. You went up it you say?
A. I went up it when it was being driven. It was a very wet and dangerous raise, and rocks falling.

640 Q. I wish you would take the pointer and indicate to the court the point of starting—just indicate upon the model the point at which that raise was started?

A. I should say, looking at it now, that that was started a little below—I have forgotten whether it was here or here.

Q. That would be where?

A. That would be the end of a north crosscut from the 1300 on the Elm Orlu mine—no, I will take it all back; it must have been from our 1200 because that work had started in and run up.

Q. Can you give us the number of the crosscut upon the 1200 at the end of which the raise was started?

A. It is marked 1221 on here.

Q. And how far did it proceed upward?

A. To the 800.

Q. Who did that work?

A. Why, miners in the employ of the Elm Orlu Company.

Q. At the instance of the plaintiff in this action?

The Court: Certainly there will be no controversy over this.

Mr. Kremer: The purpose is to show, so that the court will understand my purpose, whether it is proper or not, is to show that they started the raise, abandoned it and we took it up and finished it.

The Court: Assume it and say so. Certainly there will be no controversy about an issue like that.

Mr. Gray: Certainly.

Mr. Dickson: You concede then, Mr. Gray, having car-
641 ried it up to the 800, a portion of the way, before you reached the 800 foot level being driven in granite, that you stopped it there because you found the vein from the 800 pursuing an inclination towards the——

Mr. Gray: I will do no such thing. I will bring Mr. Pyle here——

The Court: This witness does not know about that. Proceed.

Mr. Kremer:

Q. What did you find at the top of that raise? By that I mean when the Elm Orlu had finished its work upon it at the 800?

A. I found that the raise had left the soft and wet vein, that it had been following up, and passed off into the granite and it came up on a very small crack to a drift immediately south of the drift marked 1814 on this model.

Q. Do you know why the raise was driven in the granite?

A. I am not competent on that question. I have no knowledge of why the raise was driven in that way. I simply went to inspect the raise as it existed in the ground.

Q. The raise was afterwards continued, was it not, after it had been abandoned at that point?

Mr. Gray: I don't like the suggestion in that word "abandon."

The Court: If you want to show what was in the raise,
642 drive right straight to the point and ask him if the vein did not take a different course, if that is the object. All of this sparring around seems to me is needless.

Mr. Kremer: I thought it was material to show that they did go so far and stop.

The Court: Ask him the question directly and get through with it, if he knows anything about it.

Mr. Kremer:

Q. The raise was continued by the Black Rock people, was it not?
A. A raise was up near by, near the place where the other raise was put up; it might be called a continuation.
Q. And upon what did that raise proceed; was it upon a vein?
A. Upon the Jersey Blue vein.
Q. And was it upon the same vein that the raise was started at the 1200 Elm Orlu?
A. It is my belief that it is the same vein.
Q. Was the raise continued—or was the connection continued from any of the lower levels of the Black Rock mine to the 1200 foot Elm Orlu?

Mr. Gray: There is no dispute upon the fact, your honor; all the witnesses have shown the continuation.

Mr. Kremer: The difficulty with counsel as I see it is he states his own side of the lawsuit and says what his witnesses have stated must be true.

The Court: He may answer the question if he knows.

643 A. There is a connection at present downward to the 1300 foot level of the Black Rock mine.
Q. To the 1300?
A. Yes.
Q. Was that connection made by the Black Rock people, do you know?
A. I have no positive knowledge.

Mr. Gray: I think that is immaterial.

Mr. Kremer:

Q. Then, doctor, the same vein has been raised upon from the 1300 foot Black Rock mine to the Black Rock tunnel, is that correct?
A. It is so shown on the model and I so found it on the ground.
Q. Is that a fact?
A. I believe it to be a fact.

The Court: I think if you would have asked him that question first it would have saved all the rest of the questions.

Mr. Kremer: I didn't know that they would admit that was granite notwithstanding the fact that the model shows it.

The Witness: There is a small clay slip in the portion marked "granite," running up.

Mr. Kremer: Since the adjournment yesterday there has been an addition to your model in connection with that vein, has there not, or that raise?
A. There has been.
Q. Where was the addition put on since the adjournment yesterday?

644 A. The point indicated by my pencil which is the extreme east end——

Mr. Kremer: You have the wrong one.

Mr. Gray: If you wish I will call the man that made the model.

Mr. Kremer: No, no; I am asking him another question.

The Court: Was that addition made with your knowledge and consent?

Mr. Kremer: We have no objection to it except we want to point it out, to show that here—to show that with reference to this model a connection has been put on since; we are not criticising it.

The Court: The court wants to know something about it. These models and maps are introduced in evidence and are not to be mutilated.

Mr. Gray: We have a statement to make to your honor concerning that matter. Some questions were asked yesterday concerning a raise or certain raises upon which the witnesses said they had not been; they were very recent work and we just had received the surveys.

Mr. Kremer: I am not criticising that, you understand me.

The Court: The court does not want them put on or changed without the knowledge of the other side at least.

Mr. Kremer: No criticism of the act; I merely wanted to
645 point out that part that has been put on since.

The Court: Proceed.

Mr. Kremer:

Q. Where was the place?

A. The raise extending from the 1238 drift of the Black Rock mine upward to the 1221 north crosscut of the Elm Orlu mine has been added and is painted here in a slightly different tone.

Q. And that is all, is it?

A. That is all in the Jersey Blue vein.

Q. All in vein material?

A. All in vein material, yes.

Q. Point out to the court what other addition was made to the model—this is not in criticism of the model——

The Court: Well, but the practice is bad, that is the idea. The practice of changing evidence without the knowledge of the court, or anything, that is certainly bad, that is what you are doing when you change these models.

Mr. Gray: These are new workings.

The Court: I know. The court is very glad to have it brought in but it must be brought in with the knowledge of the court and the knowledge of the other side.

Mr. Kremer: We had knowledge.

Mr. Gray: The same man is making both models.

The Court: I simply want it to be known that the court must be considered in these matters.

646 The Witness: A raise has been added from a point on the 1509 crosscut of the Elm Orlu mine, to the extreme east end of the 1410 crosscut of the Elm Orlu mine, and from that point upward to the 1202 crosscut of the Black Rock mine, this raise being slightly offset on the 1410 crosscut. That, in so far as I know, is the only addition made to the model since it was presented to the court yesterday morning.

Mr. Kremer:

Q. What is this doctor, shown in this raise that you have last referred to, the red?

A. This raise, the red shows quartz with the Black Rock fault cutting through it.

Q. Of what system is that ore deposition?

A. It appears to be a detached and faulted block of the Rainbow deposition.

Q. It is a part of the Rainbow lode, is it?

A. I am unable to say positively because the only inspection I made of it was in going up the raise itself where it was out by the Black Rock fault and appears first on the south side of the Black Rock fault and that other raise on the other side of the Black Rock fault.

Q. That raise that I referred to a minute ago, upon the other side, the raise which you characterized as being upon the Jersey Blue, is that raise shown upon any of your cross sections?

A. I don't recall; I just can't recall that, to make sure. The cross sections were not prepared under my direction.

647 Mr. Gray: I would say it was not, you only furnished us the surveys I think yesterday.

Mr. Kremer: We shall not get into any controversy about that. You have had it for some time, or some of your men have.

Mr. Dickson: May I suggest that they now be put upon their cross section.

The Court: Oh, I think if the cross section does not show it it is not at that particular point, I don't know as they ought to be directed to put it on. You can make a cross section of your own showing that, if it will serve you any purpose in your case.

Mr. Dickson: It is at a point we regard as of very much importance.

The Court: When you come to put in your case you can delineate it either in the background or the foreground of one of these sections, if you desire.

Mr. Kremer:

Q. Doctor, is it not unusual to find a branch of the Rainbow lode diverging on its strike from the general course of the Rainbow lode in the manner that the Pyle strand does?

A. Not at all unusual. The same phenomenon can be observed in the well known mines on the Rainbow lode farther west.

Redirect examination.

By Mr. Gray:

Q. Mr. Kremer has called your attention to the Block Rock fault on the 1600 foot level, and I think he had you indicate where
648 in your judgment it might pass through the south line of the Elm Orlu. Are you familiar with that fault to the south of the south line of the Elm Orlu?

A. I have seen a fault which is correlated with this fault in the Pilot ground.

Q. And what do they call it?

A. The Poser.

Q. And what is the fact as to its cutting both the northwest and east and west veins in the Pilot?

A. It cuts off absolutely all the veins found in the Pilot ground with which it comes in contact.

Q. That is it faults them?

A. It cuts them and faults them.

Q. How about in the Emily and the Badger, does the same fault show there?

A. The same fault is shown in the workings of the Emily and Badger State mines.

Q. Cutting the veins?

A. Cutting the Badger State vein and cutting the Emily vein; cutting all the veins there.

(Witness excused.)

649 *Testimony of Fred Searls, Jr., for the Plaintiff.*

FRED SEARLS, JR., after being duly sworn as a witness for plaintiff, testified as follows:

Direct examination.

By Mr. Gray:

Q. Mr. Searls, state your name and residence?

A. Fred Searls, Jr.; I reside at Nevada City, Nevada.

Q. What is your profession?

A. That of a mining geologist.

Q. Where were you educated and where have you practiced your profession and what experience have you had?

A. I began to get acquainted with the mining business 14 years ago, having worked as a miner in California and Nevada mines for three years prior to and during my technical education, which was received at the University of California. I graduated from the University of California, from the Department of Mining and Geology, and subsequent to graduation spent one year at that institution as an instructor in mineralogy and geology and in studying and taking post graduate work in geological subjects under Professor

Lawson. Since that time I have been continuously engaged in the study of examination of ore deposits in various parts of the North American continent. This study has embraced mines in Can-
650 ada, such as the properties of the Canadian Copper Company at Sudbury; the Silver properties at Cobalt, the gold mines at Porcupine, and a study of the Juneau and —— properties in Alaska. I am familiar with nearly all the large mines in Colorado and Nevada, a good many in Arizona and some in Mexico. I have been the last four years geologist for the Goldfield Consolidated Mines Company who operate large gold mines at Goldfield, Nevada, and have been engaged as a geologist for various other companies operating in that state. I represent the Canadian Exploration Company in the State of Nevada, and make examinations for them in other parts. I have been connected with the various properties of the Gun-Thompson interests, having been geologist for the Mason Valley Copper Company and the Mines Company of America.

Q. Are you acquainted with the properties in controversy here, the Black Rock and Elm Orlu, and some of the adjoining territory?

A. I am tolerably well acquainted with those properties, and have spent some six weeks in the study of the underground workings, and have visited nearly all of the accessible portions of those veins, with the possible exception of one or two workings which have been very recently made.

Q. In connection with that study have you attempted to trace the outcrops of the veins that are shown in those mines?

651 A. I have.

Q. When did you commence your study of the mines, Mr. Searls?

A. About 14 months ago.

Q. Now, in your own way, will you state what that study of these mines and of the outcrops, and your tracing the outcrops of the veins shown therein has disclosed to you as far as the geological structure of the properties are concerned, and of the veins therein and their relative ages, and in your own way state to the court the conclusion which you have arrived at from your study and investigation, and use the maps or the model or any other exhibits that you have in answering that question.

A. It seems to me that the natural place to begin an examination which has for its purpose the discovery of the locus of the apex of an ore body is in the ore body itself. That is the thing that an investigator wants to know about first, what it looks like. One of those ore bodies involved in this controversy, as I understand it, is that from which the stopes on the 1400 and 1300 Black Rock levels have been excavated. These stopes are shown on the model, Plaintiff's Exhibit 46, right there, marked with the numbers 1404 and 1304. These stopes were excavated from a magnificent body of zinc ore, a large body of good ore, from two to four or five or even six sets wide, and one attribute or one condition of that ore body to which I wish to refer briefly is its banded structure. It is possible in
652 looking at the ore body in any face of that stope to tell in which direction its major extent is, which way it is running,

which is by reason of the laminated or banded appearance of the ore. I dare say that the banded appearance of the ore in these veins in Butte is sufficiently familiar not to need much comment, but to emphasize it in regard to these particular ore bodies, I have here a piece of ore which came, not from that stope but from the same ore body of the 1200 foot level of the Elm Orlu. Its banded or laminated appearance is very evident from a casual inspection, and that appearance is very plain indeed in the stopes.

(Specimen of ore number S-2 marked Plaintiff's Exhibit 49.)

The Witness: In addition to that rather fine or minute lamination of the ore, the ore body itself, as it appears in the face of the stope, is banded in a larger way. There are bands a foot or two or three feet in width of nearly pure sphalerite. Next to that will be a band of granite with less sphalerite in it, and then perhaps a band of gray quartz containing some sphalerite and pyrite, so that the appearance at the face of the stope is very plain, in that it indicates in which way the strike and dip and structure of the ore body is. The miners, when they put the timbers in those stopes, do not have to go out to the walls of the vein to find which is capway, and which tie way in the stopes; they can orient the timbers right from
653 the appearance of the ore.

Now, in visitng the stopes which I have just mentioned, the 1404 and the 1304 stopes, it is very apparent indeed that the same structure does not persist from one end of those stopes to the other. It is very apparent that the major portion of the ore has one structure, and that superimposed upon that and cutting across it is another structure, so that in the stopes themselves there is not only a suggestion but a very marked occurrence of one vein going over in an east and west direction and another vein cutting across the structure. I have here a sketch of the ninth floor of the 1400 stope.

(Sketch marked Plaintiff's Exhibit No. 48.)

The Witness: The sketch which I hold in my hand, marked Plaintiff's Exhibit 48, is a sketch of the 9th floor of the 1400 Black Rock stope. To make this sketch accurately I took a transit man in there and surveyed the stope, and the pencil line shows the outline of the stope. At the more easterly end of the stop where the ore has been taken out one can see the banded zinc ore with a gouge on its hanging wall, striking nearly due east and west, with a slight northeasterly strike perhaps, and a dip to the north of 70 degrees, at this easterly end of the stope. This structure is plainly perceptible in the back of the stope as you look up over the timbers, continuously along for about 170 feet, till you get to a place near the west-
654 erly end where the timbers suddenly branch out into the southerly side of the stope. At that point the appearance is of another vein coming into the stope. The banded zinc ore which has a northeasterly strike comes up against a distinct vertical gouge, which cuts that banded zinc off and terminates it and drags it around slightly, disturbing it, and on the other side of that gouge, and a lit-

tle further along, the previously existing zinc ore is dragged and broken and crushed so that we have a breccia there of ore. This structure striking N. 70° W. and with a vertical dip is then traceable across the stope from there to the end of that particular floor. The conclusion that the vein which has a northeasterly strike there has been cut across and broken by a later vein having a northwesterly strike and a vertical dip at that point, is inevitable.

The same thing is visible in the back of the 1304 stope, where, however, the structure of the later vein which may be seen breaking the zinc strands, makes a very acute angle with the structure proper of the zinc ore. It seems to me that it is unnecessary to show, in arriving at a conclusion that one vein is later than another, that the later vein faults and displaces the older vein; I think that all geologists frequently come across veins—come across interscctions of veins where there is no faulting and no displacement; one vein can cut through the other without disturbing it very much. This is a matter within the experience of all geologists, but as a simple
655 illustration of it, I have brought down from the McLeod crosscut which is a little below the surface in the Elm Orlu claim, a piece of altered granite, which shows in an intricate way, or in a very small pattern, a vein which in that crosscut at an east and west strike, cuts at right angles by little veinlets, which can be seen in this rock to cut right across the other vein without any faulting or displacement; nevertheless the continuation and continuity of each of the veins through the other is very apparent. This specimen is marked S-1.

(Specimen of rock marked Plaintiff's Exhibit No. 50.)

The Witness: In making this last statement, however, I do not mean to say that the Jersey Blue vein passes through the Rainbow vein without any faulting or displacement of the Rainbow vein; there are a large number of places in the mine, in the stopes, where the Jersey Blue vein may be seen cutting straight through the Rainbow, and seen to not only terminate the structure of the Rainbow or interrupt it, but to actually displace it in such a way that the faulted bands can be matched up horizontally and the displacement determined very accurately. I would like to call attention to several such places that have come under my observation and which I have carefully noted.

(Witness draws sketch on sheet marked Plaintiff's Exhibit No. 51.)

656 The Witness: The first place of which I wish to sketch the condition is in the stopes immediately above the 700 foot level of the Black Rock mine. This is the stope immediately over 703 and 704 drifts. At the time I visited this stope it was up three floors, so that the back of the stope was three floors or about 24 feet above the drift. At the time of my visit, looking up into the back of the stope at the top of the timbers, the vein which was being stoped in that stope could be seen to be cut across and interrupted by

the gouge and vein matter of the Jersey Blue vein, which could be followed continuously down the stope to the 702 drift, and thence out to the east. At this point in the stope the cut off of the ore by the Jersey Blue and its displacement was very clear indeed, and by stretching a tape along the back of the stope the exact amount of displacement could be measured, which, in that particular case, was 9 feet 2 inches.

The next place which I wish to sketch where I have seen the Jersey Blue vein cut through the Rainbow lode is in a point between the 1100 and 1200 foot levels of the Black Rock just west of the Black Rock shaft, nearly underneath the 1102 drift. This sketch is of the stope on the eighth floor above the 1200 foot level. On this floor the vein, which was being stoped, had an east and west strike, practically, and extended in an easterly and westerly direction so that the capway was this way across the stope (indicating); across this corner
657 of the stope the Jersey Blue vein could be seen cutting across the stope and terminated absolutely. The bands of zinc ore and the banded structure of the Rainbow lode which was just as distinct in the stope as it is here on this paper, ended where the vein cut, by so cutting across the whole Rainbow lode, at the time I was there, because the stope had not projected to the west far enough to terminate in this portion of the Rainbow lode; it was very distinct indeed, and the identification of the vein which cuts the Rainbow is the Jersey Blue unquestionably, because it was visible in the drift only about four feet lower.

Q. Indicate that on the map?

A. That stope was vertically underneath the point about twenty feet west of transit station 843 in 1102 drift of the Black Rock mine.

The Witness: I was discussing at the time court took a recess sketches made in the stopes in the mine, and during that recess I have added one more. The bottom sketch on this sheet is a sketch of a drift on the Jersey Blue vein, the end of the drift on the 450 level of the Black Rock mine. It is shown on the model, Plaintiff's Exhibit 46, being this drift to which I now point. There is no number on the drift, but it is a drift on the 451 crosscut. There is a little tip of that drift, turned this way, which is not shown on the model, which extends for 6 or 8 feet. The drift is numbered 456 on Plaintiff's Exhibit 11.

658 By the Court:

Q. Running southeast?

A. Well, it was run northwest from the crosscut. The end of that drift shows the Jersey Blue which is followed in the drift, having a northwest strike and a dip of 78 degrees to the south, cutting off the mineralization of the Rainbow lode, which at this point consists of quartz and manganese in definitely banded form. Along the northerly edge of the end of the drift is shown a strand of the Black Rock fault, which here cuts off the Jersey Blue as well as the mineralization of the Rainbow lode, so that in this exposure we have a record

f three distinct geological features, the Rainbow lode subsequently
ut and displaced by the Jersey Blue in such a manner that granite
s brought up against the abutting ends of the strands of the Rain-
ow lode, and then, later than either of them, the Black Rock fault
hich has cut both the Rainbow lode and the Jersey Blue.

By the Court:

Q. Point out on that model where that is again, and show me that crosscut and drift.

A. The crosscut runs nearly directly south from the Black Rock shaft, and is the 451 crosscut. A drift has been run from that northwesterly on the Jersey Blue vein.

Q. These are the backs, the roofs of these various workings that you have mentioned?

A. Yes, sir.

659 Q. And to visualize them you would hold them overhead?

A. Yes, sir. I would explain that there is a difference in the coloring scheme as employed in these sketches and as employed in the model. Underground it is difficult or impossible to tell a hand specimen of the mineralization of the Jersey Blue vein from one of the Rainbow lode, and in making sketches underground it is customary, in my own case at least, to use a color to signify vein matter and another one to signify gouge matter, so that in these sketches the blue represents gouges, and the red represents quartz, manganese, zinc and vein matter generally, and to that extent they visualize more exactly the appearance of the cutoff of the Rainbow by the Jersey Blue than in the case of the model, where the whole Jersey Blue, including the quartz and zinc, is shown in the blue color.

There has been discussion here as to the apparent discrepancy as to the distances which the Rainbow lode has been faulted by the Jersey Blue. I think that is a difficulty which is more apparent than real. The faulting of a lode in original cross sections by a small fault cannot be expected to show in a horizontal section the same apparent horizontal throw at every place at which it may be observed. If your honor will permit rather a homely explanation of that I can illustrate it with a potato.

The Court: Do you mining experts know anything about agriculture?

660 A. I don't; Mr. Wiley does. I have sliced this potato which I hold in my hand in a direction through its major axis and I will move it in an inclined direction, neither along its horizontal axis as I hold it now or its vertical axis. I am now putting some toothpicks through it to hold it firmly in the position I placed it. I will now slice this potato through in this position. The apparent displacement along the cut is roughly a quarter of an inch at this particular horizon, we will say the 700 level. Slicing it through at a point somewhere below where the irregularities of the thing have accentuated the apparent displacement there is at least double that which was evident in the first horizontal section.

Mr. Dickson: In each instance, however, the displacement is in the same direction?

A. That is so in this particular case. However, I have tried to find a potato which was irregular enough so that in slicing it in that direction I could produce an apparent displacement in one direction in one case and in the other direction in the other case, which can very readily happen in the case of a faulted, cracked ore body.

The Court: You mean the wall of the vein being irregular would produce that appearance?

A. Yes. So I have indicated two reasons which it seems to me are sufficient to show that the Jersey Blue vein is a structure separate and distinct from the Rainbow lode and which passes through the Rainbow lode cutting it and breaking it and crushing it,
661 and in many places slightly displacing it. There are additional reasons. There are additional reasons which on examination of the two veins in question, the Rainbow lode and the Jersey Blue, convinces one of their separateness, of their dissimilarity. One of these which is very evident from the model, Plaintiff's Exhibit 46, is the straight line character and comparative simplicity or comparative conformity to a single plan which the Jersey Blue exhibits as contrasted with the Rainbow lode. The workings themselves in the stopes in the Rainbow lode show a forking, ramifying vein of considerable width and general irregularity in character as contrasted with the simple line of drifts and raises which have followed the Jersey Blue from its interception with the Rainbow lode on the 1300 and 1400 levels up to the surface. In nearly every working which has been drifted along the Jersey Blue the entire vein is removed in the working. The raises, as one looks at the side of them going up, show one wall on one side and one wall on the other side and the drifts show the whole vein in back of the drift. The stopes that have been taken from the Jersey Blue in the 1012 and 1014 drifts are stopes that are one set wide as compared with the larger stopes in the Rainbow lode which in some instances are as many as fourteen or sixteen sets wide. Another point of dissimilarity is one which is rather impressive and conflicting to the mining engineer, and that is the contrast in the percentage of stoping area on the two veins. As may be seen at a glance from the
662 model, the percentage of stoped ground in the Rainbow lode is very large. It is easily forty or fifty per cent, whereas in the Jersey Blue which has been developed for 1500 feet on its strike and for 1500 feet on its dip the only stope that has been taken out of the vein except where it is included or is crossing through the stope taken from the Rainbow lode, is this little stope in 1012 and 1014. I calculated roughly the percentage of profitable ground in the Jersey Blue vein and it is between one-third and one-half of one per cent, whereas the Rainbow lode is easily forty or fifty per cent. In an investigation of the question at issue in an effort to decide whether the Jersey Blue vein is a distinct vein from the Rainbow lode and to produce what evidence was available of its distinct character, it occurred to me to examine the area in the immediate vicin-

y of these claims with this idea in view that where—in almost very district there are several veins developed and it is very usual o find particularly where the country rock is homogeneous, that he veins conform to one or two or three distinct systems or parallels r sub-parallels within these systems. With that idea in mind I ave made a survey extending from the Black Rock and Niagara laims for some distance westward along the Rainbow lode and I ave here the result of that survey in the form of a sheet which I ould like to exhibit to the court.

Mr. Gray: Mark it, will you please?

The plan marked Plaintiff's Exhibit 52.

The Witness: This map is on a scale of 100 feet to the
663 inch—I refer to Plaintiff's Exhibit 52—and shows the croppings which may be seen and examined on the ground from the Raymond, the Niagara claims westerly, through the Elm Orlu, the Poser, the Valdemar, the Magna Charta, the Alice, and over to the corner of the Frank Moulton. This line or chain of croppings has been referred to in this camp I believe for a long time as the Rainbow lode. I have surveyed these croppings with a transit, and have indicated on the map certain pits and the tops of old stopes now inaccessible, which were constructed from levels run from these various shafts. A casual inspection of the maps, even, will show that, aside from the croppings of the Rainbow lode shown in red, extending in a direction a little north of east, we have not only one, but a series of veins with a northwest strike, which may in several instances be traced across the old croppings, and be seen to fault and displace them. In the Alice claim, the large stope into which one may peer from holes along on the surface, may be seen distinctly faulted and displaced a distance of over one hundred feet by a northwest vein, visible at many places on the ground, and visible also just off of this map near the Belle of Butte shaft. I think this vein is called the Scarum vein; I don't know much about it. It is also visible in the tripod shaft of the Frank Moulton. The displacement of that quartz there by this northwest vein is very evident to anybody from an inspection of the ground. Following in an easterly direction in the Alice claim, very little can be seen of the
664 vein in this area near the easterly end line of the Alice, on account of the big dump which obscures things there, but a strand of it may be seen to turn in a northeasterly direction, and going around the edge of the dump the vein may be seen in several small shafts on the Fraction claim, and this can be followed practically continuously through the big open stope into the Magna Charta, to a point opposite the Magna Charta shaft, and there is a very massive strand of the vein 30 feet wide immediately to the south of that. There is some sort of disturbance in there, under the dump of the Magna Charta; I don't know whether a northwest vein passes through there or whether the Black Rock fault, sometimes also called the Poser fault, runs over in that direction, but there is some sort of a dislocation in that area. From there on the vein can

be readily traced through this large open cut here, where many thousand tons of ore have apparently been taken, and other strands of it may be seen to the north in other stopes and cuts, and from there on the mineralization and croppings are practically continuous, except insofar as they are jogged in several instances by northwest faults, which carry widths of vein matter of from four to six feet, down to a rather stronger vein in the Poser claim, which is called the Poser vein, and I believe is also referred to as the Emily vein; and the displacement of that vein is apparently quite large in this section. The displacement of the more easterly portion of the Rainbow, that is to say, on the east side of the Poser fault plane,
665 is very apparent in the 400 foot level of the Poser mine.

From there on this strand is obscured for two or three hundred feet, and is again revealed as the Black Rock fault in small pits just west of the common end line between the Poser and the Elm Orlu claim. From there on the vein is continuous as already testified to and as depicted upon the 20 scale surface map, on up through the Elm Orlu claim into the Black Rock claim, faulted by the Jersey Blue and by the Poser fault and by another little fault, and the main strand of it extends through the Niagara tunnel and across the Black Rock Niagara line and into the Raymond, at which point it runs under the tailings and wash in the gulch, and is not visible for some distance. On going out to the east, however, beyond the limits of this map, the vein may be again seen at least 100 feet wide of massive quartz off in this area to the north and east of the map, and may be followed for a distance of at least half a mile, interrupted by several other faults, such as the blue ones depicted on this map. In the vicinity of the discovery shaft of the Black Rock, under the Black Rock dump, another strand of the Rainbow is seen to depart in a more easterly direction, and is terminated within the limits of the Black Rock claim by another northwesterly fault. I will refer to that again.

The completion of this map of this lode, the Rainbow lode, chopped into blocks time and again by northwest faults, which in every instance that I have seen are very similar structurally,
666 and in every other way to the Jersey Blue, has done very much to convince me of the similarity of the Jersey Blue with these other veins, and of its separate and distinct character as compared with the Rainbow lode.

Q. Mr. Searls, in starting in there you spoke of the general course being east of north. From your map I don't suppose you meant that; it is a little north of east as shown on the map?

A. Yes, surely that is what I meant. It is almost east and west, but with a direction a little north of east.

I have referred to several of the northwest veins visible in the mines under discussion here which are not depicted on this map. The Deadwood vein crosses the Rainbow lode and faults it as may be clearly seen from this model, just east of the Black Rock shaft, and the cutoff is visible at many levels through the mine, and the vein is displaced, as in every instance, the more westerly portion going south. That Deadwood vein I was not able to trace on the

surface, and I did not show it on this map, but it probably goes through here somewhere and dislocates those croppings. Then there are a number of small fault veins like this one to which I now point, and which is shown on the large map, Plaintiff's Exhibit 4, in the dotted blue line just south of cut C. When we put that on the map we had not seen that fault; we had this lower strand of the Rainbow lode in this cut B, the more southerly strand, and we had it in cut C and it was apparent that they were the same band
667 of quartz, so we thought there must be a fault in there, and since that a drift has been run on the McLeod level, which is 30 feet below the surface, in a southerly direction almost directly under the point of cut B, and the drift was run east on this strand, and at a point 44 feet from the crosscut that particular strand of the vein may be seen clearly terminated by this fault vein, and is of course displaced in the same direction, the east side going north. I have shown several other veins which are visible on the surface, and in a more detailed and intricate way in the mine there are a great many of these small northwest faults which are not traceable for long distances or even from level to level. The whole country is seamed with them in a northwesterly direction. I think they put some of them on the map in the 1700 and 1600 crosscuts of the Elm Orlu this morning.

By Mr. Gray:

Q. Do you regard those as of any material importance?

A. No; they are very short, you know. You may map one crosscut and show one there, and go to another crosscut 100 feet away and map that and you cannot trace them across there. They have a very short length.

Q. Before you leave this question of faults, I want to show you the 1000 of the Black Rock. On that level there is an apparent faulting of both the Jersey Blue and the Deadwood. Point to those.

A. The Jersey Blue is faulted by the Black Rock fault,
668 and the Deadwood is faulted by a small northwest fault, indicated by the drift.

Q. Now, apparently upon the plan of that 1000 foot level there is a faulting of these two northwest faults by the Rainbow; will you explain that; are they faulted by the Rainbow?

A. I don't see that it is even apparent there. They are faulted by the Black Rock fault, which is a strike fault going through the Rainbow. The only place that I have seen where the Jersey Blue vein seems to be faulted by the Rainbow is in the Black Rock tunnel level just below the surface, the point to which I previously alluded. There a strand of the Black Rock fault lies on each side of the Rainbow, and the part of the Rainbow which is there is a lenticular body enclosed between two strands of the fault, and the Jersey Blue comes up against one strand of the fault on one side of the vein, and leaves the other strand of the fault on the other side of the vein, and we have not found any piece of the Jersey Blue in between. It is there somewhere, but it has not been disclosed as far as I know.

Q. Well, upon the surface map itself there is an apparent displacement of the Jersey Blue?

A. That is the same thing that was put on the surface map, from this exposure a short distance underground; that is under the carpenter shop, and of course there cannot anything be seen on the surface of this, at the particular point to which I refer. The
669 apparent displacement there is due to the branching of the Black Rock fault.

Q. Now, take up the Pyle strand?

A. I am familiar with the Pyle strand of the Rainbow lode, so-called. It is very evident through the lower levels of the vein, on the 1200 Elm Orlu and to the 1100 and on the 1000 and 1000 of the Black Rock, a branch which extends from the Rainbow lode and lays south of the main branch of it. It extends from the big stopes in the Elm Orlu across to the big stopes in the Black Rock and then branches have been followed as shown on the model, on several levels. On the 1200 level of the Elm Orlu vein and in the 1204 drift it is an important vein and considerable stopes have been taken from that. Following out on the 1200 level, the 1232 drift was driven with the intention of following that vein, but was driven at a point too far north and the main strand of the vein as is now evidenced, the main Pyle branch, lies in the raise above the 1106 drift of the Black Rock and to the south of the 1232 drift as depicted in this model. Since this model has been brought to the stage of completion represented here the 1232 drift has been turned slightly southerly, and has picked up a big vein six or eight feet wide of manganese quartz and quartz with a northerly dip and will shortly be connected with the raise from the 1106 Black Rock level, if it has not already been done. The south crosscut from which the 1230 and the 1232 drifts have been run has also been extended and the Pyle branch
670 of the Rainbow lode is now seen with a short projection to them continuing across from these stopes in the 1204 through this crosscut into the top of the raise, down the raise along the 1104 drift and over to a junction again on the strike to the east with the main branch of the Rainbow lode. Following that vein upward it is observable from the 1000 level up, the Pyle raised to the ninth, to the eighth, where it is developed close to the Elm Orlu end line, then the raise to the 715 drift on up to the Pyle drift on the 450 foot level of the Black Rock and for some distance above. That is the raise which extends vertically above that drift. I was up that raise, and was about seven sets high, and the Pyle vein consisted of two walls with about an inch of gouge on each of them, and between there was about three feet of banded manganese and quartz, the whole being rather an impressive showing of vein material. I left Butte shortly after that and the next time I saw that vicinity the raise had been connected with the 506 drift of the Elm Orlu mine and I noticed the exposure in the end of that drift was nothing like the exposure in the Pyle raise below that point. There is exposed in the 506 drift a blue gouge about two or three inches thick with quite a strong southerly dip. It dips from 55 to 75 degrees. 506 drift has been run on that gouge. I feel very sure that that does

not represent the Pyle vein because when you get down to the raise below the 506 drift that gouge can be seen coming into the
671 raise in the second set, but the drift is going across the raise and out to the other side. While I have not been able to see the exact point of cut of it I am very sure that the Pyle vein coming up that raise has been terminated by that gouge.

Q. In other words, in your opinion, that is the top of the Pyle vein?

A. That is the top of the Pyle vein as far as I know. We spent a great many thousand dollars looking for it above there; we drove the Clark tunnel; crosscut south with the idea of picking it up if it existed and drifted around connecting with the drift from the east shaft of the Elm Orlu, and in no place on these workings or in the raise above the 506 or in the Black Rock tunnel was anything that looked to me like the Pyle vein. There are some little slips in that, but there is no Pyle vein as far as I know. The top of the Pyle vein is just below the 506 drift in that latitude.

Q. And what is its course as shown by these workings and as disclosed at that place?

A. Its course is almost due east and west.

Q. And beneath the surface of what claim is it there?

A. The Pyle vein, as far as I know, in the latitude of the raise is all within the Elm Orlu claim. But it possibly extends at all points above the 800 level across the east end line of the Elm Orlu claim. I can locate that on this large map.

Q. If you will, with a red pencil?

A. The point which I have marked "A" on Plaintiff's Ex-
672 hibit 4 is a point having the co-ordinates of the highest point at which the Pyle vein is observable at this time, a few steps below the 506 drift in the Pyle raise. The vein at that point has an east-west strike and is not observable in any of the workings, Nos. 519, 521, 504, 517, being the easterly end of the 500 level of the Elm Orlu. Therefore, since this work, covering the horizontal section where the vein should appear if it persisted in that elevation, the top of the vein is below these workings and a line drawn to represent the top of the vein would have the strike of the vein insofar as the vein is on a level surface. And insofar as the top dipped down or failed to reach the height of the 500 level the line would depart slightly to the north of the strike line because the Pyle vein dips to the north. So then from the point "A" I can draw a line having co-ordinates that are a little to the north of the strike line of the Pyle vein drawn from the point "A." This line will represent approximately the top of the Pyle vein in the ground somewhere above the 800 level of the Elm Orlu, and below the 500 level.

Q. Now, coming easterly, how does it course from the shaft or from the raise?

A. The strike of the Pyle vein as shown by the 450 level drift which is the highest point at which it is developed east of the Pyle raise, that is the point nearest its top at which it is developed east of the Pyle raise, is exactly south 80° East. That is indicated on the map in the position in which I now hold my ruler and in

673 which position I have drawn a faint red line. This would represent the strike of the Pyle vein on its intersection with the horizontal plane at the elevation at which the point "A" is taken. But, as it may not come quite so high as that and as it dips with quite a marked dip to the north, the elevation of the top of it which would be a line undulatory in the vertical projection would be somewhat to the north of that, a very few feet; and I now draw a line entirely from point "A" which would represent approximately the top of the Pyle vein, so far as we know it to exist, and therefore the line—I will continue the line westerly to the junction with the Rainbow lode because we know on the 800 and the 900 levels it does join with the Rainbow lode to the west, and this line, which I will now label "BC," may be taken to represent approximately the condition of the top of the Pyle vein, so far as we know it to exist. Reference has been made to the possibility of that strand of the vein shown in the cuts and on which the initials J. C. P. and B. and after being followed through C. B. G. H. K. and L—I mean reference has been made to the possibility of that being the Pyle vein. I would not like to say that it was not the Pyle vein, but it is not entirely impossible that above the gouge represented as existing in the 506, where it does exist, the Pyle vein may exist and may continue upward to the surface. I don't know about that. All I know is that that is the highest point that I have seen it; and that there has been considerable amount of work done above that with the hope
674 and expectation of picking it up, which has been without positive result.

Q. In your judgment then, the Pyle vein terminates in such a course against this flat fault that you have spoken of?

A. That is my belief and judgment.

Q. What is the character of the vein as it approaches this top?

A. Well, it gets weaker all the time. In the raise just above the 450 foot level there is a very decent vein in places. In fact the last time I saw it there was quite an impressive showing, four feet of vein, but, as compared with the vein in the stopes below and in the lower raise it is very much weaker.

Q. What is the fact, in your judgment, as to the vein being continuous from this top that you have described beneath the surface of the Elm Orlu down to and into the large stopes that are shown upon the model beneath the connection, some place below the 1100 foot level, and where these stopes are found under the Black Rock claim?

A. I know it is continuous from that point down as far as the 100 level because I have seen it all the way. At the 1000 foot level, where I have seen it, it has a marked northerly dip and would in the next 100 feet or so come into the large stopes which are there, certainly part of the Rainbow vein.

Mr. Dickson: I don't think we dispute the fact that the bottom of this raise connects, starts out with this stoping, at all. My
675 understanding is that we don't dispute that.

Mr. Gray:

Q. The model shows in the 1504 drift a vein extending beneath the surface of the Admiral Dewey and Jersey Blue claims. What is your judgment as to where the top or apex of that vein is as marked in red there?

A. There are two veins shown in the drift mentioned. The vein which is marked in red and which has been followed westerly in the 1504 drift is part of the Rainbow lode and can be traced continuously up through the raises into the upper workings and stopes of the Elm Orlu and it has its apex in the Elm Orlu claim just north of the shaft. The raise which extends upwards from the 1524 drift shows at its bottom the Jersey Blue vein, and the passage of the Jersey Blue vein through the Rainbow lode and the interruption of the Rainbow lode can be seen very clearly at the point where the blue color begins on that raise and that vein can be traced upward and has been done already in court and with which tracing I am fully in accord, into the upper levels driven on the Jersey Blue vein. The apex is about where the blue line is shown on the map, Plaintiff's Exhibit —.

Q. Have you traced this Jersey Blue as well as you can on the surface northwesterly?

A. I have traced up as far as the railroad track.

Q. That is north of the Jersey Blue shaft some place?

676 A. It is in relation to the Jersey Blue shaft about where I hold my pencil.

Q. And how far north of the Rainbow outcrop is that, approximately?

A. About six hundred feet.

Q. What is the character of the material?

A. Granite. There is another fault vein a short distance south of the Jersey Blue main shaft parallel with Jersey Blue and it can be traced for one or two hundred feet.

Q. Have you examined the Jersey Blue drift in the Black Rock tunnel about what is marked No. 1 on the east, and the other workings east of station 183L?

A. Yes, sir, I examined them quite carefully.

Q. Do you know who drove the workings, the No. 1 drift—that is from 775 to 786, and 836 to 786, and from No. 1 east to station 786 to 787.

A. That was all done by the Black Rock company or miners in their employ.

Q. Do you know who drove the drift shown on the Jersey Blue from 831 to 1052?

A. That was done by the Black Rock miners at the request of the Elm Orlu Company.

Q. Will you just describe the work as it was carried on there and what it showed and what you found in those workings that I have referred to?

A. I would not be able to give the chronological sequence of all the work exactly because I wasn't here at the time.

677 Q. All right, then; just what you saw there?

A. The Black Rock tunnel crosscut intersects the Jersey Blue vein at transit point 795. At that point there is an old drift on the Jersey Blue vein which is covered, and work was started from transit point 478, driven in a southeasterly direction and intersected the vein again at station 479 a short distance from where the crosscut tunnel first hit it and a drift was then started east and followed the vein to station 831 and then the drift turned off from station 775 and continued on to 786. There is a continuous vein along through that drift for forty feet from 775 to the east, although one wall crosses the drift where it leaves the more southerly drift at station 775, and the portion of the vein which extends easterly is drifted from 775, and called No. 1E—thins down and decreases in size and dies out very rapidly as the drift progresses east. I would like to refer to my note book if I may for details at that. At station 786 a portion of the vein is in the north wall of the drift and courses up rather rapidly and goes through that portion of the drift. Station 787—at station 787 that vein which is narrowed down to a mere seam, probably a foot wide, is interrupted by a gouge which comes in to the north wall of the drift just north of station 787 and that little gouge can be followed continuously in back of that drift approximately to its face. It is dipping south at forty degrees and it is a fault seam just a foot below selvage.

678 Q. Is that the same seam that was started on here and left, the Jersey Blue, in the No. 1 East?

A. No, sir.

Q. What has become of it?

A. The last that we find of that vein is just about where I hold my pencil, under the No. 7 in drift 787, where it comes against that little fault gouge. That is all there is of it. There is a little bit of that wall which extends out into the drift from 786 toward 199, and it does not reach out far enough to reach that crosscut that goes south of 1144.

Q. What becomes of it?

A. It dies; that is all there is of it.

Q. What becomes of that which they follow out from 836 to 1114?

A. Well, that was done very much later; that is a new drift, driven about a couple of months ago, I think. That is not a strand of the Jersey Blue; it is cut off right at station 836; you can see the Jersey Blue vein going by 836, 863, 1002, and the vein in there is, as the Jersey Blue usually is, rather a small straight vein, and the little gouge slip that is in this drift from 836 to 1144 is seen in the roof to come up against that gouge, and be cut off; so I don't know what that is, but it is not a split in that vein, and it only extends through that drift from 836 to 1114 and on a little, about 40 feet toward 1120, and that is all there is of it.

679 Q. Now, I note that all those workings are aimed toward the discovery shaft of the Black Rock, and that some of them have been carried on over to that point.

Q. State whether or not those workings or any of them have been

carried on the Jersey Blue vein or any portion of the Jersey Blue vein or upon any vein from station 831, from 835, from 836 easterly beyond the points which you have already indicated?

A. No, there is no vein there from this drift through station- 199 and 800 and along No. 843 which is about the point at which the violet gouge is marked crossing it going toward station 1120, it is in barren granite; there is no vein of any kind in there. The seams that are shown across here are very much exaggerated, as there is nothing there at all.

Q. How about from the violet seam up there till you get to the Rainbow vein?

A. Well, on the east of the violet seam about 20 feet, about station 843, there is a little bit of a seam in the side of the drift, dipping 78 degrees to the south. Aside from that there is nothing at all in the drift that goes through station 843 until we get over within a foot or two of the wall of the Rainbow lode, which passes through station 808.

Q. How about this other crosscut that is marked as being through the granite from station 1114 over to station 3?

A. Well, there is pretty good gouge from station 1120 over towards 1122, which is correctly shown on this map, and which is undoubtedly the same gouge that crosses the drift between
680 800 and 843; but aside from that, and between that and the point at which the little gouge which is followed in from 836 through 1144, there is noth-ng.

Q. It is through granite?

A. Yes, sir.

Q. Was any connection made on any vein or portion of a vein, from the Jersey Blue over to this discovery shaft of the Black Rock?

A. No, sir, there was no vein between those points.

Q. Now, what was developed from station 831 to 1055 by the drifts?

A. The same vein which was developed by the same drift to the west thereof, the Jersey Blue vein.

Q. Have you examined the turning east of the Black Rock fault east of the discovery shaft of the Black Rock claim?

A. Yes, I was in there about three nights ago, and they are still working there, the Black Rock people.

Q. Will you state what is there disclosed?

A. I think there is a map of that, Plaintiff's Exhibit 9.

Q. First there seemed to be two strands or portions of the Rainbow lode shown upon Exhibit 9?

A. Yes.

Q. Where does the more northerly wall cross at the surface in your judgment the lines of the Black Rock claim?

A. The more northerly strand, which seems to be the main strand, lies to the north of the Black Rock fault, and is shown in
681 the Niagara tunnel from point 388, near its portal, south-westerly through station- 393, 394 and 395 to 400, and so with the little stub crosscuts that are run off of that, the vein is quite clearly defined in that tunnel.

Q. How far is this below the surface?

A. Well, the portal of the tunnel is at station 187, so it is barely under the wash.

Q. So the vein crosses through the north line of the Black Rock?

A. The vein crosses through the north line at a point from 510 to 570 feet northwesterly of the northeast corner of the Black Rock claim.

Q. Now, if you will take up the other strand there and describe that and state where it goes and what lines in your judgment, if any, of the Black Rock claim it crosses?

A. The more southerly strand of the Rainbow lode at that point, in that latitude, has not been followed as far as I know north of the Black Rock fault. It begins to the southeast of the Black Rock fault, and can be followed through station- 1051 and 1007, and was evidently followed in that place a good many years ago, because that portion of the workings were driven through old gob, and old timbers, and we can see fragments of veins still on the walls of the old gob, and follow evidently old workings through there, stopes and drifts, and that vein is continuous through 1007 and 1096, and you can see its width at 1096 by crawling over the loose gob
682 lying in the crosscut which fills it nearly full, to the north of 1096, and we find the vein there is about 18 feet wide. It is a good vein, and is continuous through 1097, 1099 and 1107, and it is faulted at 1107. I don't know just exactly whether the detail of that fault is shown there, but it is faulted there anyway a short distance to the north, and is followed in drift 1108, where there is a good gouge on the southerly wall, and the vein in there dips to the south and the drift between 1007 and 1147 is in granite on the south wall—it is all in granite for a little distance there. The more southerly drift between station- 1107 and 1147 and from there on easterly the drift is driven right on the south wall of the vein, and there is a good vein in it, and that vein continues to station 1118, the more easterly portion of it being represented up there by the same vein material in places, and also by old stopes and evidence of former workings, and at station 1118 that vein is interrupted and cut off and terminated absolutely by a small fault vein having a strike of north 20 west and a steep dip to the north; it has a fair gouge and about from six inches to two feet of black quartz and manganese. That drift follows the wall of the vein, and shows the cutoff all along the wall there; it is driven against the fault vein, and since this map has been made the Elm Orlu Company has requested the Black Rock Company to crosscut due north from there, and it is not indicated on the map. The last time I was in there they had gone 35 feet—with the idea that this fault vein
683 continuing on out here northwesterly, that the other portion of this southerly strand of the vein, which I believe they call the Stoner vein, would be found on the other side of the fault cutting it off.

By Mr. Dickson:

Q. That was your idea, the idea of the Elm Orlu people?

A. Yes; they wanted to know how much that faulted; it was cut off by the fault, and I think that drift was run about 45 feet, when it hit into the wash, the loose material, and came out to the daylight, and from there below that point on the surface the whole hill is covered with the tailings of the Black Rock mill.

By Mr. Gray:

Q. In your judgment is the other end of that vein east of that fault that is shown in 1118 and 1119?

A. It is somewhere off here to the north; I don't know whether it would abut on this fault vein within the Black Rock claim or in the Niagara claim.

Q. Now, just continue that work which has been done there?

A. From station 1119 the drift follows this fault vein for a distance of about 40 feet and the fault vein goes into the south wall of the drift, and recently the Black Rock Company have started to drift southeast from there following that vein. I was in there the other night and they had gone in about 10 or 12 feet, and still had the vein. They were also extending this crosscut southerly from
684 station 983 in the granite. The drift was of course driven the other way; the mill tunnel was run, and this drift was driven in from 983 to 1048, 1109 and 1110. That drift does not follow any vein at all; it crosses numerous stringers of fault vein character.

Q. Is there any portion of the Rainbow disclosed here in this part of the ground?

A. No, sir; the most easterly point at which I have seen the Rainbow lode there is at station 1118.

Q. Mr. Searls, at what point in your judgment on the common line of the Elm Orlu and Black Rock claims has the main strand of the Rainbow vein, that is, the foot wall, the southerly wall, crossed that common line, measuring it from the southwest corner of the Black Rock?

A. We have pretty good data on that point; there is pretty nearly sufficient data because there has been a trench run on each side of the line, which discloses the apex of the Rainbow lode, and this trench to the north of the line, I think, was dug for a water pipe trench, and the Black Rock fault crosses that trench 138 feet from station 114, just at the bend of the trench, about where the green line is shown there. From there there is quite an abundance of quartz about five feet, and then from that point there is altered material, granite that has been kaolinized, bleached, and containing little seams of rusty material for about 13 feet more. Now, in trench
E on this southerly side of the line the Black Rock fault
685 crosses where it is shown on Plaintiff's Exhibit 4, and there is quite an abundance of stuff which shows silver and manganese to the east of that for a distance of 23 feet, and from that on to the east there is granite there which is altered and has little rusty seams through it, limonite, for a distance of about seven feet more.

Q. Do you consider that as part of the vein?

A. I consider it as part of the vein; it is present in the stopes below; it is altered granite and they have to take it out with the ore in those places. If that be included in the vein the vein exists in those two trenches almost exactly as shown on this map Exhibit 4, and it crosses—by connecting the exposures in those two trenches it crosses the common line at a point about 308 feet to the southeast of the southwest corner of the Black Rock claim. Referring to your original question, I would not say that that was the south wall, because there is not any wall there. No wall crosses in that position, but that is rather the extreme and slightly indefinite limit of the mineralization which accompanies the vein.

Cross-examination.

By Mr. Dickson:

Q. I understand, Mr. Searls, the lode or vein that you speak of as the Rainbow, belongs to what is called the east and west system?

A. I believe it is called that, yes; it is nearly east and west in strike, a little north of east.

686 Q. And that the Jersey Blue belongs to a northwest-southeast system?

A. That is certainly true.

Q. As delineated on the map, Exhibit 4, from the extreme limits of the Rainbow lode as depicted on the map, from the west end line of the Elm Orlu to the northerly termination as shown upon Exhibit 4 on the northerly branch of the Rainbow lode, what is its average course; how far does it depart from an east and west course, taking the northerly points at those extreme ends?

A. The direction between those two points is north 76 east. I might add, Judge, that the strike of the entire lode is better shown on this map of mine.

Q. Well, this will answer my purpose; north 76 east?

A. Yes.

Q. As depicted upon the surface of Plaintiff's Exhibit 4, taking the extreme ends of the Jersey Blue vein as they are painted, what is the course of that vein; there is some dispute about this mark; you had better give it from this point here, the Jersey Blue, where it comes in contact with the Black Rock fault as depicted on this map.

A. I will give it any way you want, Judge.

Q. Well, take it both ways?

A. The direction of the line joining the extreme exposures of the Jersey Blue as depicted on this map is north 72 west. The direction of the line joining the point furthest northwest at which the

687 Jersey Blue is depicted on this map to the point at which it is intersected by the Black Rock fault is north 77 west.

Q. Will you take down the 100 foot level please, of the plaintiff's map—no, that is not the one. It is Exhibit No. 8 that I want. Referring to Exhibit No. 8 and that portion of the Jersey Blue depicted upon that exhibit from station 775 westerly to the extreme west end of what is represented here as the Jersey Blue, what is the average strike there?

A. The course of a line joining the exposure of the Jersey Blue in the Gulch tunnel to the point at 775 is north 82 west.

Q. How far beneath the surface is that level?

A. Throughout most of the distance it is about 80 feet beneath the surface. To the northwest it is slightly less.

Q. The westerly portion of the Rainbow lode as shown upon your Exhibit 4, and I mean by the westerly portion from where it is represented as crossing the west end line of the Elm Orlu, to about where it crosses the common side line, the dip of that vein is to the north, is it not, the Rainbow vein?

A. Well, it is in a general way, yes; as it departs from the surface in the vicinity of the Elm Orlu it dips to the south.

Q. I know; I will come to that afterwards. Pull down the 1400 foot level Black Rock.

688 *Q.* From where you have the Rainbow lode to a point directly south of the end line of the Black Rock extended in its own direction, on the surface, how far is the Elm Orlu vein south of the south side line of the Black Rock?

A. You mean how far vertically?

Q. No, how far south at the surface, how far south of the south end of the south side line or the southeast corner I will put it of the Black Rock claim is the Rainbow vein found at the surface, within the Elm Orlu?

A. To the northerly limit of the vein it is ninety feet.

Q. That is what I want. And at the western end of the Elm Orlu at the surface, how far from the northwest corner of the Elm Orlu is the apex of your Rainbow found, as painted upon this Exhibit 4?

A. 190 feet to the north boundary.

Mr. Gray: He measured to the northwest location corner—so that there may be no question about it.

Q. On the 1400 foot level how far is the northerly boundary of the Rainbow vein north of the southwest corner of the Black Rock?

A. 114 feet.

Q. So, taking the vein, its downward course from the surface to the 1400 foot level, the average dip must have been very considerably to the south, taking it as a whole—to the north I meant to say?

A. Yes. That north—that ground gained north is principally gained below the 1000 foot level. The vein is approximately vertical to the 1000 and then dips.

689 Q. Then the easterly portion, I judge by looking at the surface map Exhibit 4, the easterly portion of the Rainbow vein as there depicted and again depicted upon the 1400 foot level, the dip of that portion must have been considerably to the south, taking it from the surface down to the 1400?

A. Well, it is very slightly to the south.

Q. I wish you would refer to these cross sections—you didn't refer to them in direct examination, but unless objection is made, I wish you would do so—the cross sections which were testified to by Professor Irving?

A. Which ones?

Q. The ones that show the westerly end line of the Elm Orlu. Do you know whether that is the most westerly one of these sections?

A. No, sir. This is the most westerly. This goes west of nearly all the works, section 1.

Q. Can you indicate on that section, section 1, what levels this portion of that section is that I now point to?

A. About the 700 foot level of the Elm Orlu.

Q. From the surface of the 700 foot level according to this section the Rainbow lode *had* a southerly dip?

A. Slightly to the south, yes, sir.

Q. That is true of the next section also, nearly down to the 800 level?

A. Yes, sir.

Q. And the next one, Exhibit 28; what would you say about section 3?

690 A. Dips two or three degrees to the south.

Q. And section 4?

A. Still dips south.

Q. Down to or below the 700 foot level?

A. It is very nearly vertical.

Q. That is if you take the most southerly branch at the top?

A. Yes, sir.

Q. And if you take the most northerly branch there is a pronounced dip to the south?

A. That is true.

Q. Tell me whether or not the surface, where cut by this section 4, is obscured by debris, buildings, or anything?

A. Yes, sir.

Q. And have you ever seen the surface?

A. I have not.

Q. How do—do you know how any one in the last year or two, since this suit was commenced, was able to depict the width of the croppings on that section 4 on either the southerly or northerly branches of the Rainbow vein shown thereon?

A. Yes, sir, I do know.

Q. How?

A. Because at a distance of twenty-two feet below the surface the ground was cut by the discovery tunnel, which cuts the veins mentioned and shows their width exactly.

Q. How far beneath the surface——

691 A. The surface there is——

Q. How far beneath this surface is that tunnel?

A. About twenty feet.

Q. And on section 4 we have represented, I take it, what I now point to, the southerly line of the vein as cut by the tunnel?

A. That is true.

Q. And the croppings as represented upon this section at the surface are still southerly of a line drawn vertical to this point for some distance?

A. About three feet.

Q. Just turn to the next section or two.

(Witness indicates.)

Q. On direct examination you spoke of the Pyle branch of the vein being much narrower at the top than you observed below the 500 foot level of the Elm Orlu; than it was at the bottom of the raise?

A. Yes, sir.

Q. The main branch of this Rainbow lode varies in thickness as you go down upon it, does it not, very materially?

A. Very materially.

Q. For instance on this section 7 how wide is it represented as being at the top?

A. One hundred feet.

Q. And how wide where cut by the 1300 foot level?

A. 230 feet.

Q. And how wide where cut here at the 700 foot level?

692 A. About 12 feet.

Q. There is nothing unusual in this vein and all other veins, in finding marked differences from point to point in the strike of the vein and from point to point as you go up or down on the plane of the dip of the vein?

A. That is certainly particularly true of the Rainbow lode.

Q. The main branch as well as the Pyle branch?

A. That furnishes one of the rather distinguishing features as compared with the Jersey Blue, which is approximately the same width everywhere.

Q. Referring to your sketch No. 1, Mr. Searls, I wish you would fix a little more definitely than we have done—if we wish to examine it we will know just where you place it, what place you were speaking about—a little more definitely where this sketch was made in the mine, or is supposed to represent?

A. You can see it best, judge——

Q. Give it with all the precision possible?

A. The sketch shows the ninth floor of the stope above the 1404 drift, or the sill floor——

Q. Sketch 1, your sketch 1. I understand you had three sketches, that is the one I want.

A. I misunderstood you. That place is of course gone now; it is stoped up.

Q. What is that?

A. The place where that sketch was taken is not now observable; it has been stoped up.

693 Q. Never mind. Fix it as well as you can. If not observable now it may have been observed by some of our witnesses in the past. I don't know how that is. Indicate it fully if you will upon Plaintiff's Exhibit 14, the 700 Black Rock?

A. That sketch is of the back of the third floor of the stope above the red—near transit station 179. I have marked it as being the end of a red line with the initial "A" on it.

Q. How near transit station or point 779?

A. I can't say; within a foot or two.
Q. North or south of it?
A. It would be nearly over it.
Q. Almost nearly over that transit point?
A. Yes.
Q. You say that is not observable now?
A. No, that stope has continued up beyond that, higher than that.
Q. Does what you call the Jersey Blue fault or the Jersey Blue vein continue upwards to the roof of the stope as it now is?
A. Yes, sir.
Q. So it can be seen in the roof now?
A. That stope has now proceeded up to the 800 level of the Elm Orlu and it so happens that the 800 level vertically over that point is on the intersection of the 823 crosscut or the 812 drift, and is badly caved and I think in order to observe that same condition one would have to do a little work, take some lagging out and show it
694 up. Now, I know it is observable all the way up that stope because I saw the same thing in the 702 stope.
Q. Pretty near above the point you have indicated, in your sketch one?
A. Yes, sir.
Q. Could that lagging be removed without danger of caving?
A. I think you could stull up there a little and fix it, yes.
Q. And is it observable, the faulting or crossing, as observable in the roof of that 800 as it was where you took your sketch on the 700?
A. I am satisfied it is, but I haven't seen it at that particular point. I have seen it in 702 drift vertically below it.
Q. Tell me again as nearly as you can the precise point where your sketch 2 was taken on the plat, the point represented in your sketch 2?
A. Sketch 2 is the back of the eighth floor of the 1202 stope. Of course there are no transit points in the stope and the nearest I can come to it is——
Q. You are referring to Exhibit 19, 1200 Elm Orlu and 1100 Black Rock?
A. Yes.
Q. Give it as nearly as you can?
A. The point would be almost vertically below station 843, being about four floors down in the stope.
Q. About four floors down from what level?
695 A. Below the 1100 to the 1200.
Q. And almost vertically beneath transit point 843, shown upon this exhibit?
A. Yes, sir.
Q. And your sketch 3, tell me where that was with reference to one of the level sheets?
A. Sketch 3 is at the easterly end of 456 drift.
Q. As shown on Plaintiff's Exhibit 11?
A. That is not quite correctly shown.
Q. That is the map you are referring to?

A. Yes, sir. As a matter of fact the 456 drift turns——
Q. Locate the point on this exhibit?
A. I will mark that point "B."
Q. Where you made the observation is point "B?"
A. Yes.
Q. Then, the end of the line running through the letter "B" in lead pencil is where you made that observation?
A. Yes, sir.
Q. And that is about how far—about what distance—where is drift 46; is that shown on this plat?
A. The sketch is at the end of the face of 46 drift and back for a distance of twenty feet or so.
Q. Have you ever observed, Mr. Searls, post mineral fault in places, being a strike fault, in the Jersey Blue vein?
A. In the Jersey Blue vein?
Q. Yes?
696 A. No, sir.
Q. I don't mean a strike fault from one end of it to another, but for considerable distances, especially west of the Black Rock fault where there is a post mineral strike fault increasing to the northern boundary of the Jersey Blue vein?
A. No, sir. The Jersey Blue vein usually has on its north boundary gouge, but gouge is not post mineral fault; it is pre-mineral and it can be distinguished; it is banded and comes up against it.
Q. Did you hear the testimony of Dr. Weed in which he spoke of such post mineral faulting along the Emily vein?
A. I don't remember that; I haven't been in court all the time, Judge.
Q. And is it your opinion based upon your observation that nowhere in what is called the Jersey Blue vein westerly of the Black Rock fault is there found a strike fault; I mean by that a fault practically coincident with the course of the vein, in the northerly wall or boundary at least?
A. I certainly can't see any, Judge. I have seen a gouge fault, it has a gouge fault in common with the other veins, but I don't regard it and don't see any reason for regarding it as post-mineral.
Q. Now, I wish you would indicate, so it would appear in the record in what portion of the mine your Exhibit 48 was taken, or what portion of the mine at what level and between what
697 points that is intended to be a picture of?
A. That is a picture of the ninth floor of the 1404 stope of the Black Rock mine.
Q. Between what points easterly and westerly?
A. It is from the east end, to the west end. At the time I was there—it continues a little farther west.
Q. But how far to the westerly does that sketch cover?
A. It covers a stope from the easterly end of the stope for 270 feet west along the strike of the stope.
Q. In each of the places represented on your sketches 1, 2 and 3, you have referred to what you call the Jersey Blue vein on the southeasterly side of the Black Rock fault, have you not?

A. Yes, that is true?
Q. What?
A. That is true.
Q. You have referred to none where you see the vein faulted, Rainbow vein faulted, in your judgment, by the Jersey Blue vein, in a direction northwest of the Black Rock fault?
A. That is not true.
Q. Not on any one of these three anyway?
A. Not on any of these three sketches.
Q. But it does on Exhibit 48?
A. Yes, sir.
Q. At what point?
698 A. At the point where the Jersey Blue vein enters the stope and is seen to be cut off and terminated.
Q. That is on the 1400 foot level of the Black Rock?
A. No, sir; that is on the stope nine floors above.
Q. Nine floors above the 1400 level?
A. Yes, sir.
Q. Turn to your Exhibit 52?
A. Judge, might I add a word to the last answer with reference to your last question, about the fact of all these sketches showing the displacement of the Jersey Blue to the south of the Black Rock fault. I may say that that is entirely a coincident, for I have plenty in my note book to give you on the north side, and I will be glad to do that if you want, but I did not want to get useless repetitions, that is all.
Q. Will you produce Exhibit 52? The Rainbow lode as shown upon this exhibit has not the appearance at this point of having been dislocated by the Jersey Blue vein?
A. No, not there. I mentioned that, and described that point there. I mentioned it as being the only point where I could see that appearance, that point in the Black Rock tunnel. It is the only place in the mine that I know of where the Jersey Blue gives the appearance of being faulted by the Rainbow. That is due to the fact that there is a piece of the Black Rock fault on each side of it.
Q. Going to the Pyle branch of the Rainbow lode, point out to the court the highest level, the uppermost level driven on the
699 Pyle branch easterly of the Pyle raise, if any there be?
A. The Pyle vein is disclosed in the 821 drift.
Q. And 821 drift is driven how far in an easterly and then a southeasterly direction from the Pyle raise about?
A. It is about 150 feet.
Q. Can you show me that on one of your level sheets, the 800 of the Elm Orlu?
A. Yes. I might say further in relation to the map that that drift does not follow the main part of the Pyle vein all the way.
Q. Does it follow any part of the Pyle branch all the way?
A. I think it does.
Q. Will you point that out on Exhibit 15, being the 900 Elm Orlu and the 800 Black Rock?
A. I am pointing to it now, at Station 895.

Q. And there in the drift, the turn in the drift forms a crosscut?

A. Yes, and I might explain how that came about. The reason that the drift turned about that way was through an error in the survey by the Black Rock surveyors.

Q. In what respect; they were following a vein all the way, weren't they?

A. Well, it was turned—after the drift was in a ways we were down there and it was turned, and that portion of the vein
700 ran out of the crosscut near the intersection between the crosscut and the drift.

Q. A portion of the Pyle branch?

A. Yes, sir.

Q. And another portion of it?

A. And another portion of it was followed in the drift, but we asked the Black Rock people to run a crosscut along the end line of the Elm Orlu claim, with the idea of disclosing this northerly branch of the Pyle branch wherever it might go, and that is what they did. In other words, the map we had showed this drift in about the position in which I now hold my ruler, and crosscut 825 extending northerly along the line.

Q. Did it catch or intersect the northerly branch of the Pyle branch?

A. No, and it never would have either, probably.

Q. Wasn't it driven the way you wanted it?

A. Driven the way we wanted it—it was driven by the Black Rock people.

Q. The way you requested it?

A. If this drift had been in the position which the survey showed, and had extended in the direction in which we asked, it would have intersected the Pyle branch.

Q. Did you make any objection to the way it was being driven by the Black Rock people, as they understood your request?

701 A. We did not discover it until quite recently; that is, I did not, and the drift is caved now.

Q. You requested the Black Rock people to make a crosscut out of that?

A. Yes.

Q. And they started to do it?

A. Yes.

Q. And did drive it the distance you have stated, and without any complaint from anybody on your side?

A. Yes, but they did not drive it in the direction that we asked.

Q. Without any complaint from your side that it was not being driven in the way you wanted?

A. That is true.

Q. Now, this drift easterly on Exhibit 15 from the crosscut in which are found stations 802 and 806 down to the workings intended to represent a raise here—that is the Pyle raise?

A. Yes.

Q. The work running westerly and southwesterly from there—

southwesterly to the southwest raise? Is that following in your opinion the Pyle branch of the Rainbow vein?

A. It was the last time I was in there. I suppose that drift is now about in the position where I now hold my pointer, and that the 900 foot level has been driven to correspond.

Q. Now, step to the model again. In addition to this little cross-cut southeasterly from the raise shown on the model and
702 marked 821 and 825, what other working is there easterly of the Pyle raise between that raise and the easterly end line of the Elm Orlu claim, if anything, in the way of a raise, or winze or any other opening?

A. There is a drift on the 1100 foot level of the Black Rock.

Q. Above that, I mean.

A. There is none.

Q. What is the distance from the surface down to the 1100 foot level of the Elm Orlu, easterly of the Pyle raise to the east end line of the Elm Orlu?

A. You mean the 800 Elm Orlu or the 800 Black Rock?

Q. I mean the 800 that you pointed to here a minute ago.

A. That is the Black Rock.

Q. Well, the vertical distance from the surface down to that 800 foot level, if it were extended out at the east end, and also that raise as seen from the map the hill drops off to the east there.

A. About 650 feet at the latitude of the raise, but at the end line it would be——

Q. Well, that would be about 600 feet probably.

A. About 600 feet.

Q. Now, westerly of the Pyle raise what is the uppermost drift that you have on the Pyle branch of the Rainbow vein?

A. The 900 foot level of the Elm Orlu.

703 Q. Point to the place?

A. —at which point the Pyle branch is being stoped.

Q. How far is that beneath the surface vertically?

A. It is about 825 feet.

Q. And what is the distance from the last point you spoke of——

A. The 908 drift.

Q. At the easterly end of that drift?

A. Yes.

Q. On the Pyle branch?

A. Yes.

Q. What is the distance from the easterly end to the east end line of the Elm Orlu?

A. 635 feet.

Q. And in that distance easterly and westerly of 635 feet and a vertical distance from the surface down to the uppermost working on the Pyle branch of from 600 to over 900 feet, this so-called Pyle raise is the only opening there is?

A. Yes, sir, that and this little drift, on the 450 Black Rock.

Q. Yes, we will get to that. On the Pyle branch I mean?

A. That and the drift.

Q. What level or what altitude—how far beneath the surface is it

where there is a drift running off from the Pyle raise easterly to any other raise?

A. Westerly, you mean, Judge.

704 Q. Westerly I mean—from the one you have just referred to?

A. 410 feet.

Q. Now, what is the length of that drift that runs westerly, that is set off from that raise?

A. 104 feet.

Q. Has that drift any name to put into the record, or can you give it any name or mark it?

A. Yes, sir; it is 455 drift, so marked on Plaintiff's Exhibit 11.

Q. And from the westerly end of that drift there is another raise started up?

A. Yes, sir.

Q. How far up that raise were you; have you been clear to the top?

A. Yes.

Q. What crosscut does that raise go up from?

A. From 451 crosscut.

Q. How far up that raise from 451 crosscut have you found the top of the ore where all the ore had been cut off by a slip?

A. If I recollect rightly the highest point at which I saw the ore was in the sixth floor, which would be about 48 feet.

Q. Above the 451 crosscut?

A. Yes, sir.

Q. How much of a vein did you have there; what was the evidence of vein material—what was the thickness of it?

705 A. About four feet; that is, on the east side of the raise the two walls had diverged a little, and there was a horse of granite in between, but the total thickness of the vein would be about the same.

Q. And that was cut off by a slip?

A. Yes, I believe it was.

Q. Are you uncertain about it?

A. Yes; I have never seen the cutoff.

Q. You did not see the slip?

A. I have seen the slip, yes. The slip is now plainly visible in 506 drift, and can be seen in the raise in the second and third sets below the 506 drift.

Q. As shown on the model that slip is further up the raise than the top of what is painted as ore and vein?

A. It is on that side, but on the other side it is painted differently. I happened to paint that piece there, and I left that white because I had not actually seen the cutoff there, though I believed it was cut off.

Q. Did you see the ore cut off there?

A. No, I did not.

Q. Describe that slip, that is, the magnitude; how thick was it?

A. Well, the real gouge I should say was about two inches thick.

Q. What was its direction in strike and dip?

A. Its direction is very well shown by the 506 drift, which fol-

lows it continuously from end to end. It is practically east and west.

706 Q. What is its dip?

A. It varies from 65 to 75 degrees to the south.

Q. Now, you say that there are many little slips and seams that interrupt and cut off veins that cannot be followed any considerable distance easterly or westerly or from one level to the other?

A. That is certainly true in this mine.

Q. And there, can you say that that is true of this little slip?

A. I don't think it could be followed very far.

Q. Either on its strike or upward or downward?

A. No.

Q. And identified?

A. I think not.

Q. You spoke, Mr. Searls, in your direct examination, of this Pyle branch as disclosed in the Pyle raise, having a northerly dip, and in one place I noted that you said it had a marked northerly dip. That is true of that part of the raise of the 801 crosscut down to where that raise connects with the big stopes below?

A. Yes.

Q. But from that 801 crosscut up it is standing vertical, is it not?

A. Practically vertical, yes; there is an occasional offset in the raise, you see, to keep it in the vein.

Q. From there up it is practically vertical?

A. Well, at 801 there are six offsets, meaning that the vein has gained south 30 feet.

707 Q. Just as the main branch of the Rainbow vein in the Elm Orlu ground stands there vertically till you get down to the seven or eight hundred foot level, where it dips to the south, or inclines to the north as you go upward from the 700?

A. No, it is just the other way, Judge; this vein gains 30 feet to the south as you go up. The Elm Orlu vein in the upper levels goes to the north as you go up.

Q. What would you say that this vein will do that was four feet thick the last time you saw it; may it not do just as the main branch of the Rainbow did, namely, go over to the north, which would bring it over your Elm Orlu side line?

A. Well, I don't think it will do that; I think it will die, because we have run a lot of workings up here, that if it had that dip that you speak of, that southerly dip, it would be intercepted in the Clark tunnel somewhere. You see if that vein continued up here with a dip to the south, it would come in these workings, and we could not find it anywhere.

The Court: The question you asked was if it might not turn north and pass through the Elm Orlu side line?

Mr. Dickson: The northerly side line, I meant to say.

Q. It would not have to change very much in dip for it to do that between the surface and where you have it disclosed at the uppermost point that you do see it with a width of four feet; it

would not have to incline upward to the north very much
708 in that three or four hundred feet to bring it over the northerly side line at the apex, would it?

A. It would have to change through the vertical and dip south.

Q. Yes, but a very slight angle would do it, wouldn't it; that is over three hundred feet from the surface down to the top there, isn't it; 310 feet, I believe it is?

A. I can measure it. Well, it would have to dip about 80 degrees, 75 to 80; in other words, it would have to change about 20 degrees in dip.

Q. From what observation or conjecture or speculation, Mr. Searls, have you platted on Exhibit 4 the red line marked BC, with the letter A over at this point with a circle around it?

A. Answering that question——

Q. I will change the question. You have platted on Exhibit 4 a red line at the easterly end of which is the letter C and near the westerly end is the letter B, and between those two points is a circle in red color with the letter A. If I understand you, or do you wish to be understood that that represents in your judgment where the top or apex of the Pyle branch of the Rainbow lode would be if it did come to the surface?

A. No, sir.

Q. What did you intend it to represent?

A. I intended to represent, and I believe it does represent as closely as the developments now warrant it, the top of the Pyle vein.

709 Q. You have no further information—you have not been able to make any further observation to lead you to the conclusion or conjecture, rather, that you have not already given to the court, have you?

A. No, sir.

By the Court:

Q. You mean that that line represents the top of it at the 400 or 500?

A. That the point A represents the highest point where I have seen the Pyle strand, where I believe it terminates against a little gouge. The line drawn through from B to C represents the top of that vein at that elevation.

By Mr. Dickson:

Q. That is to say, if you came from that point perpendicularly to the surface, that is where your line would be on the surface?

A. Yes, perpendicularly, because it is a projection of the plan map.

Q. Then you have given it a northerly dip, haven't you, in representing this line?

A. I have, because I believe that the top of it going to the west might run down hill a little, so to speak.

Q. It might?

A. Because the workings in the 500 level would tend to show that it did.

Q. That point A with the circle, as I understand, is intended to represent the last point in the raise where you found the vein?

710 A. Yes.

Q. Have you got it accurately located on there?

A. I have, accurately, yes, sir.

Q. The center of that circle is intended to represent the center of the raise?

A. Yes.

Q. Taking the center of the circle, give us the distance from thence northerly to the north side line of the Elm Orlu claim?

A. You mean the south side line of the Black Rock?

Q. Well, the patented north side line of the Elm Orlu; it is the same thing?

A. Well, you said northerly.

Q. Well, I mean at right angles to the strike of the common side line to that circle?

A. It is 50 feet.

Q. Have you been in any workings down in the vicinity of the top of that Pyle raise that have been done in the last week or two by the Butte Superior Company?

A. If I have I don't know anything about it.

Q. You have not seen any workings there disclosing vein continuing on upward with a southerly dip rising to the north in vein?

A. I imagine that the gouge down in 506 will rise to the south.

Q. That is not what I am speaking of; the gouge you refer to in 506, that was work done by the Elm Orlu people?

711 A. Yes.

Q. I am speaking of the workings of the Black Rock people or the Butte Superior. You are not familiar with them?

A. I am not familiar with them.

By the Court:

Q. Which way will you say that gouge will rise?

A. I say that that gouge down in 506 will rise to the north I should have said; I was mistaken there.

By Mr. Dickson:

Q. You had some little seams of ore in 506?

A. Yes, there are little seams in there.

Q. But you don't identify either of them with the Pyle branch of the vein?

A. I don't think I do.

Q. You don't think the Pyle branch of the vein is disclosed in any of that line of workings?

A. I failed to find anything that looks like it.

Q. Of course you are not bound by it, but some of the witnesses on behalf of the plaintiff have testified, referring to Plaintiff's Exhibit 4, a map on which are found certain trenches, namely D, F-2,

G, H, K and L, that the vein represented there and disclosed in those trenches is the Pyle branch of the Rainbow vein. Do you subscribe to that or not?

A. Well, I won't say positively that it is not, but I don't think it is. It may be.

The Court: You are only asked for your best judgment as you know the situation. Witnesses sometimes seem to think that
712 they must be able to answer positively. It is only the highest degree of probability that the circumstances will stand that you are supposed to testify to where absolute knowledge is not possible.

Q. Acting upon the court's suggestion, what is your best judgment, Mr. Searls, as to whether this vein that I have called your attention to in these trenches, is or is not the Pyle branch of the vein?

A. I don't think it is. I could not be positive about it, but we have a good deal of working here which has not shown it to be continuous.

Q. Referring to Exhibit 8, you have represented as running slightly easterly and some distance westerly in the Dewey tunnel a series of blue streaks?

A. Yes.

Q. Are those intended to represent branches of the Jersey Blue vein or what?

A. I don't think they are branches of the Jersey Blue vein; they are small sympathetic fractures which probably occurred when the Jersey Blue vein was formed.

Q. Is there any mineral in them?

A. Yes, there is a little quartz and manganese along them.

Q. Any valuable minerals?

A. I don't think so; I haven't seen any.

Q. Did you make close observation with that object in view, to ascertain whether or not you could detect by the eye the
713 presence of any of the valuable metals, zinc or silver?

A. Well, there are stopes in there.

Q. In where?

A. In the little drifts just north of 575 station.

Q. And what about from station 813; there was stoping done there too, wasn't there?

A. I don't think so, Judge; that is new work there, and the little drifts north of 575 are old work; those are old stopes.

Q. That old stoping, do you regard that as part of the Jersey Blue vein or not?

A. Well, as I say, I don't think it is part of the Jersey Blue vein; I think it is another similar vein.

Q. Well, did you regard that as a part of the Jersey Blue vein or not?

A. I say I do not think it is a part of the vein. I think it is another small vein.

Q. Taking the crosscut or the new work that you referred to in

which station- 803 and 810 are found, thence on easterly to station 194——

A. 794?

Q. (Continuing:) —was there mineralization in that line of working, altered granite?

A. There is a great deal of mineralization along the drift from 794 to 810.

Q. From 810?

A. From 810 across to 813 there is absolutely no mineralization, barren granite.

714 Q. Without any alteration whatever?

A. Practically not.

Q. Is there some?

A. There is no quartz slips or any kind of seams in there.

Q. You call altered granite in many cases vein material, when you find it in connection with the Rainbow lode?

A. Yes.

Q. And especially when you find the Rainbow lode in your judgment crossing the common side line and boundary line, you call altered granite, irrespective of its value, vein material, do you not?

A. Yes, sir.

Q. Now, do you not find altered granite in the portion of the work or stoping from 810 to 813?

A. From 810 to 813 it is practically unmineralized.

Q. Is it altered although it had been affected by vein action?

A. No, it is not. The only alteration there might have been at all would be due to its proximity to the surface.

Q. I suppose the geology represented upon these several maps of the plaintiff—and I call your attention now especially to Exhibit 8—was put there under the direction of one or more of the experts on your side?

A. Yes.

Q. And you have observed, of course, the geology of these maps; you examined them before you went upon the witness stand,

715 the geology shown upon these several sheets, and particularly Exhibit 8?

A. Yes, sir.

Q. Did it meet with your approval?

A. In a general way. I didn't do that personally. I think there is room for improvement in all of these maps, that they could show more detail, more of the little slips.

Q. I am speaking of what is on, not what is left off; what is on there; did it meet with your approval?

A. In a general way.

Q. You didn't object to it?

A. I never objected to anything.

Q. Or suggested any changes?

A. No, sir.

Q. According to this map, starting from station 775 and running in a northeasterly direction to station 787, and then easterly it is represented as continuing until it is cut off by a slip, is it not?

A. It is so represented.
Q. Did you observe that before you went upon the witness stand?
A. No, sir.
Q. You disapprove of it now, do you?
A. I do. I might say, Judge, that it is very difficult, in fact imposible, to portary on a map of the scale forty feet to the inch the details of the little veinlets and slips in work of this kind, and when it becomes important to know just exactly how any particular
716 drift looks it is desirable to plat the thing on a larger scale and we have larger scale maps that show these things exactly and more correctly than can be shown here.
Q. The draftsman, however, put all the geology on these maps under directions given in as I understand by the experts of the Elm Orlu company?
A. Yes, sir.
Q. And while it might be difficult—and I can understand that—to plat upon a small scale map all details, it would not be difficult at all to avoid showing that this dritt running from 775 through 787 and then on to its easterly face is not cut off by a slip, would it?
A. No, sir. That map is incorrect in that regard and was evidently put on there from some incorrect notes.
Q. What have you in this line of work from 775 to where it is cut off or represented on the map there as being cut off by a northwest slip?
A. I have already testified to that in detail. Do you want me to go over it again?
Q. In a general way; I don't want to take up much time.

Mr. Gray: Would you mind him stating right now that that is carried out beyond the end of the working and appears to be cut off at a place where there is no working at all?
Mr. Dickson: I am asking him what he found in that line of work, where it stops?

A. Since you asked me to state in a general way, I would
717 say in general way it appears to me to represent an attempt to carry the Jersey Blue vein where it doesn't go.

Mr. Dickson: I ask that that answer be stri-ken out; it is not responsive.
The Court: Read the question.

(Question read.)

The Court: You are asking him what was disclosed. The answer will be stricken. Read the question to the witness.

(Question read.)

A. I have already testified to that, Judge.
The Court: Well, just repeat it on cross examination.
A. The drift from 775 to 786 follows a branch of the Jersey Blue vein quite to 786.
Q. That is not what I am asking you.

A. There is no working there. The blue line depicted going from 775 across the 787 is a projection or generalization across a part of the ground where there is no working.

Q. No work there at all?

A. No, the drift follows from 775 to 786.

Q. Are you sure about that, Mr. Searls?

A. Absolutely. The end line as shown there is eight feet north of the drift.

Q. Well, am I in error in assuming that this map intended
718 to show a line of workings from station 775 to station 787 and then on northeasterly to an apparent slip?

A. The map does not purport to show any such working. The working as shown in the black line runs from 775 to 786 and should crosscut station 787 and then another drift, evidently wandering around there.

Q. I would thank you to omit these conjectures as to what the other side was doing, what motive actuated our side in doing certain work. Then, from 775 to 786 have you a vein there all the way?

A. Yes, sir.

Q. And from 836 is that, Mr. Searls?

A. Yes, sir.

Q. To 1144 and thence to the face, what is in that, or is there no work there?

A. From 836 to 1144 is a continuous drift which follows a little slip with a vein slightly mineralized, along it, which is, however, not a piece of the Jersey Blue vein, but which is cut off right at station 836.

Q. Cut off by what?

A. By the Jersey Blue vein. And that slip continues right through station 1114 and for a distance of 150 feet to the east thereof from which point the drift in station 1120 is in granite.

Q. I am only speaking of that part that is in blue; is that in vein?

A. No part of the drift is in vein.

Q. Colored in blue, represented in blue?

A. The blue is intended to represent——

719 Q. Blue line along the drift?

A. That is true; there is a veinlet running along there.

Q. You say that is cut off by the Jersey Blue vein in its course from this easterly?

A. Yes, sir.

Q. It runs to the Jersey Blue vein?

A. Yes, sir.

Q. And in connection with it?

A. No, not only in connection with it, but in the roof of the drift you can see it cut off and dragged around by it.

Q. You were asked on direct examination about the southerly branch of the so-called Rainbow east of the Black Rock discovery?

A. Yes, sir.

Q. I understood you to say that that south branch was marked "good gouge," whereabouts?

(Here witness indicates.)

Q. Can you tell from your notes better than the model?
A. Yes, I am trying to refer to some number, that is all.
Q. Refer to your notes and tell us where that gouge was.
A. That gouge was——
Q. Take your notes.
A. Here they are, Judge.
Q. I would thank you to read your notes.
720 A. On the southerly wall of the little drift which runs——
Q. Wouldn't it be as convenient for you to point to it on this Exhibit 4?
A. The trouble is this does not show the drifts and furthermore it doesn't extend out as far as that point.
Q. Have you any maps showing the drift?
A. Yes, sir.
Q. Will you turn to them; maybe we will see more clearly than on the model.
A. (Referring to Exhibit 9.) The gouge is shown along the south end of the little drift which runs from station 1108, in a southerly direction.
Q. How far?
A. Extends the length of the drift, thirty-eight feet and dips seventy-five degrees to the south.
Q. Beyond that, in an easterly direction, have you a gouge?
A. I don't know. That is as far as that gouge is exposed.
Q. You can travel easterly of this line of work?
A. Yes, by going around. There is a wall of the vein exposed.
Q. At 1147 did you observe a gouge?
A. There isn't very much gouge there.
Q. Is there any gouge there?
A. I can't say as to how much.
Q. I didn't ask you—is there any whatever; what is your note about it.
721 A. It is marked with some gouge——
Q. Have you a note of it?
A. I have no note of it. All I remember there is a distinct wall.
Q. From 1147 easterly?
A. There is a distinct wall there.
Q. Any gouge?
A. As I recollect it there is very little gouge. I have no note on it.
Q. Is it your recollection that you have some gouge along there?
A. Yes, I think we seldom get a wall without some.
Q. And from the drift 1007 is there a gouge there too?
A. From 1107 for a short distance easterly the drift follows through old timber and old "gob" and you can't see as to the gouge.
Q. Any working from 1108 on to 1118?
A. Yes, sir.
Q. 1147 to 1118, is there any working?
A. A portion of it is, from 1118 for forty or fifty feet westerly the vein has been partially removed in old workings.
Q. Stoping?
A. I think it is stoping, yes.

Q. Calling your attention, Mr. Searls, to the drift running easterly from station 983 and the crosscut of the mill tunnel, in what drift is it you find stations 1048 and 1110—have you been through there?

722 A. Yes, sir.

Q. Is it timbered?

A. Yes, there is some timbering in there, but it is very, very clearly exposed.

Q. Roof lagged?

A. Not closely.

Q. Did you examine the roof with care or did you attempt to examine it with any degree of care?

A. The exposures in that drift were quite satisfactory, could see it well.

Q. Is there not a vein running along that roof, practically its whole length, from station 983 to station 1118?

A. There certainly is not. That drift is a diagonal crosscut which cuts a number of small fault veins.

Q. What are these representations in blue near the crosscut from the mill tunnel intended to represent?

A. They represent small fault veins which these two crosscuts cut.

Q. Aren't they mineralized?

A. Slightly, yes.

Q. Carry quartz?

A. Yes, sir.

Q. Clear across the end line of the Black Rock, do they not?

A. Probably a number of them cross the end line of the Black Rock?

Q. And carry quartz across?

A. I guess they do.

723 Q. And minerals of silver and zinc, one or the other, I don't mean in great quantities, of course?

A. I can't say as to that. These veins are of course oxidized and it is impossible to tell by a mere inspection of them what values they contain.

Q. So you are unable to say whether they do or do not carry values in any amount?

A. I think they contain very little.

Q. Can you tell your contention or your opinion as to where the main branch of the Rainbow lode crosses the common side line: I wish you would indicate, if you will, upon Exhibit 4 the point where you claim the vein, as you entitle that, in its foot wall boundary leaves the Elm Orlu and enters the Black Rock territory?

A. I have just pointed on the drift "E" and in the water pipe trench the most easterly point at which I can see any mineralization at all. Now, the closest I can get to the point at which the extreme limit of the mineralization crosses the line is by connecting these points.

Q. I wish you would do so, please?

(The witness indicates.)

Q. You have connected it with a red line?
A. Yes, sir.
Q. And just underneath the red line are your initials. And put a letter at either end of this red line, we will say OR.

(Witness indicates.)

Q. Starting from trench "E," where it is crossed by the
724 Black Rock fault, commencing there and going easterly along that trench "E" describe the mineral found in the trench until you come to what you claim is the mineralization in the southeasterly or foot wall side of the vein, or that branch of the vein?
A. Immediately adjoining the Black Rock fault in that trench is a band of quartz striking N. 70 East, colored heavily with iron and manganese and containing silver.
Q. For what distance along the trench?
A. That is a narrow—about a foot.
Q. Go on?
Q. Then there is a distance of about six or eight feet where the material is mostly granite but a little seam or stringer forming a stock work, quartz stringer and manganese stringers in the granite, then there is 23 feet from the west end of the trench——
Q. Now, go right on?
A. I just want to locate the place, 23 feet from the west end of the trench, which is about six feet further on there is a half inch seam of manganese and four inches of honey-combed quartz, and from there on for three or four feet there is just some little stringers of quartz and beyond that to the point that I have mentioned there is rather continuous—rather noticeably white kaolinized granite.
Q. Where is that?
A. That is 16 feet from——
Q. 16 feet from where?
725 A. From the east end of the trench.
Q. These little seams are disconnected seams or stringers of quartz and may be found in this Butte district all over the country wherever you search for them, can they not, apart from any vein at all—I don't mean every foot of the way but very generally speaking?
A. Yes.
Q. Where they have no reference to anything?
A. Yes.
Q. Give us an explanation of the appearance of that granite?
A. Well, the granite in the extreme end of this trench is principally the pyrite rocks and different mineral constituents of the granite.
Q. You said something about some rusty granite. Where is that?
A. That is in the area I was just going to mention.
Q. That is the area you included within the vein?
A. Yes, sir.
Q. And what distance from where you marked the foot wall boundary of the vein as it crosses that vein had you that rusty granite?
A. That is about six feet, seven feet——

Q. What else was there noticeable in that granite except it was rusty?

A. I was about to explain. It represents rather a contrast in appearance to the granite at the extreme end of the trench, in that while the granite at the extreme end is crumbly and com-
726 paratively firm—each little piece of it comparatively firm—that is the idea that—that is the area that I mentioned is just soft white, clay-like material, kaolinized.

Q. That is near the surface?

A. Yes, sir. No nearer the surface, however, than the granite at the east end of the trench.

Q. This rusty granite you have is right at the surface?

A. Yes, sir.

Q. Wouldn't you expect to find the evidences of oxidization, resulting in rusty granite, where you had a cut right at the surface?

A. I would, yes, but I would expect whatever effect on that granite were due to surface alterations would be distributed uniformly throughout the trench; and there is rather a marked difference in the appearance.

Q. Confine your attention to the rusty granite which you could see at—within the line—on your line—is there any appearance other than could be reasonably—any altered color or texture—that would not reasonably be referrable to surface actions, surface activity?

A. It is, yes.

Q. What?

A. Little strings of rust in it, just the same thing that the kaolization of the granite shows, the effect of sulphuric acid arising from the decomposition of pyrites in the rock material immediately adjacent to it.

Q. Is there any pyrite in the granite, native granite?

727 A. Very little indeed.

Q. Are you able to say that there is no pyrite in the granite, as a native constituent of the granite?

A. I could say with considerable confidence if it exists, it exists to an extent of less than half of one per cent.

Q. Has your examination of this vast district been sufficiently careful and extended to enable you to make that statement with any degree of confidence to yourself?

A. That statement is of course based upon what I have read in standard authorities on it.

Q. I am asking you from your own observation, are you able to say from your own observations that in this district and their veins—metal veins——

A. Now you are asking me another question, Judge. The first thing that you asked me was about the pyrite that was native in the granite and the pyrite adjacent to the vein that was not native.

Q. I am asking you another question now?

A. I beg your pardon.

Q. From your own observation are you able to say that pyrite is not found in the granite of this district near to and far from veins as a native component of the rock?

A. I don't know very much about that. I imagine it is.

Q. You spoke of the banding or lamination of the ore min-
728 erals in the Rainbow lode as being due, I understood you, partly to the course of the lode?

A. Yes, sir.

Q. Partly to the course of the stopes?

A. Yes, sir, in general.

Q. Have you not found in stopes in the Rainbow lode banding that was transverse to the course of the stope and course or strike of the vein, in this locality?

A. Yes, I testified to several places where the Jersey Blue cuts through it.

Q. When not cut by any other vein at all?

A. Of course in many places the direction of the ore body changes somewhat so that in carrying the timbers along the same way the structure crosses the timbers.

Q. I am not speaking about the change of course in the stopes, but knowing what the course of the stope is, haven't you found in some of the stopes at least of the Rainbow lode a band structure transverse to that of the course or strike of the vein, in that locality and at—sometimes almost at right angles to its course, when not cut by any other vein?

A. No, sir, I have not. I have observed some stopes in the mine that are long across the structure but that is due to being faulted.

Q. I am not talking of that; I am talking of the strike of the vein.

A. I never saw any such.

Q. Do you know what is called the Winchell stope above the 1700 of the Elm Orlu?

729 A. No; I know a raise called the Winchell raise.

Mr. Dickson: Mr. Winchell, I will permit you, if you know where that stope is, to point it out to the witness.

Mr. Winchell: I am not responsible for that stope.

Mr. Dickson: You know the ore referred to?

Mr. Winchell: I think this is the stope.

Mr. Dickson:

Q. Do you see it, Mr. Searls?

A. Yes, sir.

Q. Point it out.

A. That is the very wide stope above the 1300 level.

Q. Have you been on that to examine the banding?

A. Yes, both in that stope and the stope in this part of thirteen. The structure is very marked. In fact it was in this thirteen that I got these pieces of rock.

Q. I am confining your attention to the Winchell stope that has just been pointed out to you.

A. Yes.

Q. Did you not find a banded structure that does not conform to

the strike of the vein, local strike of the vein, or the stope in the vein?

A. I have not seen it. I have seen a lot of vein structure that does conform to it exactly.

Q. You referred on direct examination to the piece of work to which I now point, 1228 Elm Orlu, running in an easterly direction from where?

A. From the 1221 crosscut.

730 Q. You stated that that was started out to follow the Pyle branch of the Rainbow lode?

A. I din't say that, no, sir.

Q. What was it started out for?

A. That followed the Rainbow lode, and it started out to follow the Rainbow lode, the more northerly branch of it.

Q. The main branch of it?

A. Yes, sir.

Q. Then you had to cut back southerly to get what you call the Pyle strand?

A. Yes, sir.

Q. And expect to make a connection there?

A. Yes, sir.

Q. What drift is this?

A. It is 1106 Black Rock.

Q. That is on the Pyle strand?

A. Yes, sir.

Q. And the Pyle branch direction it goes from the Pyle raise right to the next raise westerly?

A. Yes, sir.

Q. Did you take with care the dip of the vein or the dip of that branch of the vein as disclosed in that part of the work?

A. I took several observations of the dip there, yes, sir.

Q. Does it vary in dip?

A. It does.

Q. And very noticeably from place to place?

731 A. Yes, sir, it does, rather.

Q. From a north to a south dip?

A. No, sir.

Q. How wide a variation is there?

A. It dips continuously to the north at an angle varying from 55 to 75 degrees.

Q. Have you any other level shown upon this model which was driven upon what you call the Pyle branch?

A. The 1141 drift.

Q. That is a very short one?

A. The 804 and the 821.

Q. Well, we have already been over those?

A. Yes. The 1204 drift and the stopes above it are on the Pyle branch of the Rainbow lode.

Q. Could you say that the Jersey Blue vein was more regular than the Pyle strand of the Rainbow lode?

A. Yes, indeed.

Q. Would you call the Jersey Blue vein a simple vein or a complex vein where it is developed at the westerly part of the Dewey crosscut?

A. There is a local stretch in there of about a hundred feet where it is rather complex, which is in marked contrast, however, to the main developed extent of it. I refer to this area on both sides of the Dewey tunnel a little distance, on Exhibit 8.

Q. What you designate as the faulted segment of the Jersey Blue easterly of the Black Rock fault, wherever that portion of what you call the Jersey Blue has been followed from the Black Rock
732 fault in an easterly or southeasterly direction, it gradually and very quickly weakens, does it not, so that it will soon die out?

A. Well, I don't think so, Judge Dickson. I think that on the whole the portion of the Jersey Blue to the south of the Black Rock fault is somewhat narrower and smaller than the same vein on the other side of the fault.

Q. My question is as you follow an easterly and southeasterly direction from the Black Rock fault, doesn't it continually weaken, speaking generally?

A. I haven't observed that to be the fact, in fact my observations are the other way.

Q. That it increases?

A. That it may change its dimensions and strength.

Q. Going back to the Pyle raise for another question, I will ask you if you saw the fourth floor of that raise as it proceeded upward from the 1100 foot level, or were you absent when that was run?

A. The fourth floor above the 700—well, I have been through that raise, but I have never paid any particular attention to that floor.

Q. Were you there when it was untimbered, so that you could observe it?

A. No, sir.

Q. So you cannot give us any information about that?

A. I cannot give you any detailed observation.

Q. I will ask you, Mr. Searls, if you have observed a drift running from the Pyle raise in a southeasterly direction at a point
733 about 100 feet below the 450 foot level, driven, as I understand it, by the Butte Superior people?

A. I have not.

Mr. Gray: When was that driven?

Mr. Dickson: I am sure I don't know.

A. It must have been very recently.

Q. Show us your upper level again, please, the one that shows the south branch of the Rainbow vein to the east?

A. No. 9.

Q. I understood you to say that this southerly branch shown on Exhibit 9 of the Rainbow, or represented as having been cut off at station 1118, that the easterly portion of that south branch had been thrown to the north?

A. Yes.

Q. How do you know; wasn't it thrown to the south?

A. Because all of the northwest veins are lefthand faults; that is to say, when you are drifting on a vein, when you get to one of those northwest faults you have to turn to the left to pick up the other piece.

Q. Then, if I understand you, the faulting of one of these northwest fault veins or fissures is always in the same direction—the throw is?

A. Of course my experience in the district is not sufficient to state that.

734 Q. In these mines I mean; it is always in the same direction?

A. Yes.

Q. You don't have a faulted segment of a north and south fissure—you don't find as we travel from north to south the faulted vein on the southerly side of that fault, sometimes thrown to the south and sometimes to the north?

A. No.

Q. But they are always thrown in the same direction, but with a different amount of displacement?

A. Yes, if you mean by the throw what I mean, that is to say, the actual shift in direction?

Q. Yes, that is what I mean.

A. And not the apparent dislocation, as might be observed on a horizontal plane.

Q. That is what I mean.

A. Which might vary.

Q. This new work which was put on the model last evening or this morning, represented here in red as extending from the 1500 of the Elm Orlu to about the 1200 of the Black Rock, that is in vein all the way up, isn't it?

A. Yes, sir. I have not been to the top of the raise; it goes to the 1200 of the Black Rock.

Q. Well, as far up as you have been?

A. It is in vein all the way.

Q. And it is in zinc ore?

A. Yes, sir.

735 Q. And it is in a northerly branch of the Rainbow lode?

A. Yes.

By the Court:

Q. What raise is that?

A. That is the raise from 1509 Elm Orlu crosscut up to 1230 Black Rock drift.

Q. Which branch of the Rainbow is it in?

A. It is on a branch of the Rainbow.

Q. What is the pitch of that, north or south or did you characterize it?

A. I did not characterize it.

Q. Which branch did you characterize it as, the north branch, or the main branch or which?
A. No, I did not characterize it at all.

By Mr. Dickson:

Q. Is it the south branch?
A. Well, I know——
Q. It is not the Pyle branch?
A. I don't think so.
Q. It is immediately vertically below the main stopes of the main branch of the Rainbow?
A. Well, it is vertically under the Pyle branch.
Q. Don't you think that belongs to the main branch of the Rainbow?
A. I don't know; I think that the Pyle branch and the north branch have become indistinguishable.
Q. You think they are one there?
A. I said they are one, and I think that the raises that
736 you have referred to are in a part of the Rainbow lode.
Q. Well, where the two branches have coalesced?
A. Below where they have coalesced.
Q. Have you been in the 1700 crosscut?

Mr. Dickson: You may object to that as not cross-examination, but I wish to ask it.
Mr. Gray: Yes, I object to it; Mr. Searls did not testify to that. Mr. Winchell will be on tomorrow and will testify to that.
Mr. Ellis: He said he had been in practically all the workings.
Mr. Gray: All right.
Mr. Dickson: I will notify counsel now that we will wish to recall Professor Irving to interrogate him on the crosscut in the 1700 Elm Orlu.
Mr. Gray: Do you want him to visit it again first?
Mr. Dickson: No.

By Mr. Dickson:

Q. Have you ever been in the crosscut marked 1701 and shown upon Plaintiff's Exhibit 26?
A. Yes, sir.
Q. When were you last in there?
A. Three nights ago.
Q. That would be the night of the 19th or the 20th?
A. The 19th.
737 Q. Have you any notes as to how far it had been extended at that time?
A. No, sir.
Q. Do you know?
A. No, sir—well, I cannot say that—I think it was 160 feet from a plug in the roof, but I don't know where the plug was, so I can't state.

Q. Did you see what is represented upon this map as a vein near the northeasterly end of that crosscut, as it is indicated in the black ink lines?

A. Well, I will say, Judge, that I have not studied or even examined that crosscut carefully at all. My visit down there was because I had been concerned in getting that crosscut ahead. We had an accident to the engine, and we had great difficulty in running it, and I did not go down there to make any notes on it.

Q. On the evening of the 19th you were in there?

A. Yes.

Q. Did you go to the face of it?

A. Yes, sir.

Q. And the face of it had then been extended as far as the crosscut is shown here in ink lines, had it not?

A. Yes, and I think further.

Q. Did you discover or observe near the face a vein on the evening of the 19th, as Dr. Weed testified to here, as being a continuation of the Jersey Blue vein there?

A. No, sir.

738 Q. You did not see that?

A. No, I did not look for it.

Q. If it were as represented by Dr. Weed upon this map, it must have been cut and passed by the tunnel when you were in there?

A. That is certainly true.

Redirect examination.

By Mr. Gray:

Q. Mr. Searls, will you refer to Exhibit 8. In referring to the surface map, Exhibit 4 and to the Black Rock tunnel level which is shortly below it, you spoke of the place where the Black Rock fault is separated into two seams or strands, and you said something about that being the one place where the Jersey Blue does not fault the Rainbow, or at least those are the words that I made a note of. Will you just state what the fact is?

A. The statement I intended to make, however I did make it, was that it was the one place in the mine that I have seen where the Jersey Blue cannot be seen to fault the Rainbow, for the reason that it is cut off on each side of the Rainbow by a strand of the Black Rock fault, which there envelopes the Rainbow.

Q. What is the character of the material between those two strands or branches?

A. It is quartz and manganese, some of it is rather hard ore.

Mr. Gray: Tonight I want to send Mr. Searls to one or two places in the mine and Judge Dickson said he would not object to

739 his being recalled as to those one or two points.

Mr. Dickson: Not at all. I don't object to your recalling any witness you wish.

Mr. Gray: Mr. Dickson, you said you wanted Mr. Fred Greene

again. He is here, and I desire to ask him one or two further questions also.

Mr. Dickson: Very well, that is agreeable to me.

Testimony of Fred T. Greene, Recalled.

FRED T. GREENE, recalled on behalf of plaintiff, testified as follows:

Direct examination.

By Mr. Gray:

Q. Mr. Greene, have you visited the 1700 crosscut Elm Orlu?

A. Yes, sir.

Q. When?

A. Last night.

Q. Prior to your going on the stand had you been in there to anything like the present face?

A. No; that has been in the process of driving ever since I was on the stand.

Q. Will you state what you saw in there last evening, and in that connection will you show it upon the section?

740 A. This is plaintiff's Exhibit 31, Section 6. This section crosses the 1700 foot crosscut from the shaft about at the southeast corner of the Jersey Blue, closely to that point. Beyond that corner a few feet is a vein about three and a half feet wide, northeast of that corner which has an average strike of north 65 west. The hanging wall dips about 76 to 80 degrees to the south. The hanging wall is well marked by a black clay gouge. The foot wall also has a black clay gouge on it, and in between there is rather broken, highly altered granite, in which there is scattered more or less quartz and manganese. Along the hanging wall gouge there is from two to four inches of banded quartz and manganese. North of the vein there is granite, in which the micas are comparatively fresh, the feldspars are somewhat altered, and it is slightly pyritized—somewhat pyritized. 24 feet from the foot wall of this vein is a very distinct and strong manganese seam, apparently the foot wall of the Rainbow lode, and from there to the face, a distance of about 30 feet, to the face as it was last night, there is the Rainbow mineralization.

Q. They were still working in the face, were they?

A. They are still working in the face, and driving it as fast as they can.

Q. Would you very expeditiously show that on the section 6?

A. Yes, sir. I have prepared an extension of our section, which is to include the work that has been done in the last few days,

741 with the geology marked on it approximately.

Q. Could you just pin that on, and then at the noon recess trace it onto the section?

A. Yes, sir. The conditions as disclosed underground are now placed in their relative positions, and portrayed on the piece of tracing cloth which I have attached to Section 6.

Q. In your judgment the first vein that you describe, is that the Jersey Blue?

A. I believe it so to be.

Q. How does it compare in its appearance with the Jersey Blue as you have seen it elsewhere and in the other workings in the property?

A. It has the same general appearance as the Jersey Blue elsewhere and is comparable in size with it in a great many places.

Cross-examination.

By Mr. Dickson:

Q. Will you bring down the 1700 level?

Mr. Gray: It is understood that Mr. Greene may trace that onto the section itself.

Mr. Dickson: Certainly.

Q. Referring to your notes, Mr. Greene, when were you last on this crosscut in the 1700 level prior to last evening?

A. I don't know; some considerable time ago.

Q. Can you tell us how far the crosscut had progressed at
742 the time of your last visit preceding the one of last evening?

A. Yes, sir—no, I can't. I thought I had the 1700, but it was probably 200 feet from drift 1702; something like that.

Q. I wish you would indicate on this exhibit 26 the vein that in your opinion is the Jersey Blue on that level?

A. The limits of the vein as measured by myself come just east of north of the blue line depicted upon this map, exhibit 26.

The Court: What limits are you fixing as north of the blue line, if you mean by "limit" some wall?

A. The two walls of the vein have been marked on this map by two pencil dots, as I have measured them, from station 1803.

Mr. Dickson: How far from transit point 2 in the 1700 crosscut is it to the foot wall and how far at the same point is it to the hanging wall *as* what you regard as the Jersey Blue vein?

A. It is easier to refer — point 18, if I may. Point 18 is 355 feet from point 2.

Q. Point 18 is in pencil?

A. Yes, sir.

Q. I wish you would mark that in ink if you will?

A. From point 18 it is exactly 128 feet to the hanging wall of the Jersey Blue.

Q. How many to the foot wall?

743 A. And about 131 feet to the foot wall of the Jersey Blue.

Q. What is the distance between the walls?

A. Three and a half feet.

Q. The course is North 65 west; what is the dip?

A. The dip on the east side of the crosscut is 76° to the south and the dip on the west side is 80° to the south; the average dip would be about 78°.

Q. Let me see the 1600 level of the Elm Orlu for a moment.

(Witness indicates.)

Q. Take the 1500. What is the dip of what you claim to be the Jersey Blue vein at the westerly end of the Black Rock as depicted upon plaintiff's exhibit 23?

A. The dip as measured underground is 87 degrees to the south.

Q. Practically vertical?

A. Three degrees from the vertical.

Q. What is the course of the Jersey Blue vein as depicted upon exhibit 23, say the westerly 100 feet of the vein?

A. About north 80° west.

Q. Bring down seventeen again. You haven't the Jersey Blue vein shown on any intervening level between the 1500 and the 1700?

A. No other level reaches it.

Q. How far had this crosscut progressed when you were in there last evening?

744 A. 182 feet.

Q. Indicate it?

A. (Witness indicates.) There is the face marked "face, October 22nd, 1915."

Q. And do I understand in your opinion that crosscut had not only reached but passed through the Rainbow lode on that level?

A. I don't think it has quite passed through it.

Q. For what distance along the course of the 1700 foot crosscut has it progressed, what you claim to be the Rainbow vein?

A. Thirty feet.

Q. And what have you within that thirty feet?

A. Well, seams of manganese, of the pink manganese, very well marked, crossing the crosscut in a generally east-west direction, and extending from the foot wall as shown on the section 6 clear to the face.

Q. Anything else?

A. There is another gouge seam 11 inches back from the face which runs north 44 west.

Q. A gouge seam in the Rainbow?

A. Yes, sir, running through the Rainbow.

Q. To what do you attribute that gouge there?

A. To the slipping of the ground.

Q. Is there anything else but pink manganese in the way of mineral, and the gouge?

A. Pink manganese and quartz, general vein material, very little sulphide.

745 Q. What were the thickness of the seams of manganese in that 30 feet?

A. Oh, they vary from a few inches up to eighteen inches.

Q. And the quartz seams?

A. Well, they are included somewhat in the manganese seams, sometimes separate; there is a mixture of quartz and manganese, and there is quartz alone and manganese alone.

Q. Do I understand you correctly to mean that there is a mixture

of pink manganese and quartz seams in that 30 feet, varying in width from two inches to eighteen inches?

A. Yes, sir; they are all interlacing and part of the same thing.

Q. Judging by your inspection and your ocular examination, would you say that they carry values?

A. No, sir, I would not say it would; that is, it would not carry zinc values; it may carry a per cent in silver values.

Q. And may not?

A. I don't know.

Q. On this exhibit 26, what you take to be the Jersey Blue vein as placed thereon by Dr. Weed, the vein northeasterly of that which you regard as the Rainbow lode, on that level there the two seem to have about the same course?

A. No, sir. As depicted by Dr. Weed?

Q. Yes.

746 A. Well, I am not responsible for the way he depicted it. I see they have very much the same course on the map.

Q. What is the course of what you take to be the Rainbow lode on that level?

A. The foot wall manganese seam runs north 58 west at that point as far as disclosed in the crosscut, and dips to the north about 70 degrees.

Q. There is one matter I wish to call your attention to apart from your re-direct this morning, Mr. Greene, and that is the raise shown on the model, Exhibit 46, extending from 1304 level of the Elm Orlu practically to the surface. Did you direct that any of that work should be done, that any portion of that raise should be made?

A. No, sir.

Q. You don't know why the Elm Orlu people took it up at any point, nor why they stopped it?

A. Why, when I came and first made an examination of the Elm Orlu, the raise extended then from the 1200 Elm Orlu to the 800 Elm Orlu.

Q. And was it extended further in its upward course by the Elm Orlu people?

A. No, sir; it was not extended upward at all. A new raise was started by the Elm Orlu people for the Black Rock Company.

By the Court:

Q. What raise is that?

A. It is generally called the wet raise.

747 Q. Is that the long blue raise?

A. Yes, sir.

Mr. Kremer: It has been called the Clark raise in the testimony.

The Court: Well, there are several names for it, and that makes a delightful confusion.

The Witness: Well, the wet raise is the most descriptive name, and that is the one that is commonly used under ground, because it is very wet, as the Jersey Blue usually is.

By Mr. Dickson:

Q. Going up from the 1300 Elm Orlu?
A. From the 1200 Elm Orlu.
Q. From the 1300 Black Rock, isn't it; the raise now extends from the 1300 upward?
A. Yes, from the 1300 Black Rock upward to the Black Rock tunnel.
Q. Now, the foot of that raise is about how far easterly of the west end line of the Black Rock?
A. It is roughly 200 feet.

(Witness excused.)

Mr. Gray: You also said, Judge Dickson, that you desired to have Mr. Irving recalled, and I desire also to examine him about the 1700.
Mr. Dickson: Very well.

748 *Testimony of John D. Irving, Recalled.*

JOHN D. IRVING, recalled on behalf of plaintiff, testified as follows:

Direct examination.

By Mr. Gray:

Q. Doctor, have you been in the 1700 crosscut?
A. I have.
Q. When were you first in that crosscut?
A. To my recollection I was first in that crosscut last night, that is the 1700 crosscut of the Elm Orlu. In September, last I was in both the 1700 and the 1600 Elm Orlu, and I walked out one of the crosscuts, either on the 1600 or 1700, without making any observations, and I don't recollect which one it was; but the first time I made any observations in that crosscut was last night between eight and nine o'clock.
Q. Now, will you just say what you observed there last night?
A. At a point 128 feet northeast of Station 18 there is a vein which on the northwest side of the drift has a width of about 3 feet; on the southeast side of the drift it has a width of about 4 feet. On the south wall of that vein there is a black clay gouge of from one-half to one and a half inches in width, in which there is some galena and pyrite apparently replacing the gouge. North of that gouge there is an area of strongly mineralized rock consisting I should say—I have noted here from 50 to 75 per cent of quartz,
749 manganese and pyrites with a little galena in it, and then on south, on the northwest wall of the drift there is one and two-tenths feet of solid quartz and manganese. There is a gouge which appears slightly to the south of the north wall of the vein, which has a strike of north 68 west.

By the Court:

Q. What has that strike?

A. That gouge. The gouge on the south wall has a strike of north 53 west to north 56 west; I could not be exactly certain as to the direction. That south gouge has also, mixing in with it, a seam of from two to three inches of pink manganese and fluorite. At the center of the drift I should say that the whole vein was about four and a half feet wide.

North of the south gouge of this vein which I mentioned, for a distance of 24 feet, is the north wall of another vein which has a dip of 77°, as I observed it, towards the north. The south wall of that vein—I haven't got exact measurement of the width of it, but as I recall it it was about four feet to the south—three or four feet to the south of the north wall to which I measured. That vein dips, as I say, 77° towards the north and has a strike of north 58 west. From there I proceeded to the face of the drift—I didn't measure that with the tape, but it is roughly somewhere in the neighborhood of possibly 20 to 25 feet and maybe more. There was strong manganese
750 stock work, intersecting veinlets, quartz, scattered through the granite, which appeared to me to be a portion of the Rainbow lode. Before I got to the face, at a distance of 44 feet from the south wall of the vein first mentioned, or the south gouge, there was another gouge crossing the drift which has a direction of north 45° W., and a dip to the south, whose amount I did not measure. I see I have no note of it here. That has a gouge one and a half inches on it. That I think is the extent of my observations on that drift.

Mr. Gray: The first vein you mentioned there, what vein in your judgment, is that, Mr. Irving?

A. I think that is the Jersey Blue.

Q. How does it compare in character and appearance with the Jersey Blue as you have become acquainted with it elsewhere in the property?

A. It resembles it very closely.

Q. And after passing through the granite, I believe you said the balance of it in your judgment was a part of the Rainbow?

A. It is.

Q. At least of the Rainbow mineralization?

A. Yes.

Cross-examination.

By Mr. Dickson:

Q. The gouge on the south wall of what you regard as the Jersey Blue is from an inch to two inches in thickness I understand.

751 A. One-half inch to one and a half inches in thickness.

Q. One-half to one and a half?

A. Yes.

Q. And is there a gouge on the north wall of the vein?

A. Well, it seems to me that the gouge was partly on the north

wall but crossed on to the vein, and there was quartz, especially on the northwest side, which was to the north of the gouge.

Q. Isn't this a fact, Mr. Irving, that you have a gouge of the thickness which you have given in the south wall and beyond that you have an interior gouge, that is a gouge in the interior of the vein?

A. Well, it is partly in the interior of the vein. At one point it seems to be in some——

Q. What is the thickness of that gouge?

A. One quarter of an inch, black gouge on the southeast, changing to one inch plus.

Q. What is the course of this last one?

A. That is north 68 west.

Q. Now, did you find a gouge in the interior or between the walls of what you regard as the Rainbow lode in that level?

A. I did find such a gouge, yes.

Q. Is that an unusual occurrence in the Rainbow lode, apart from a fault?

752 A. I think not. I think that is one of those northwest veins which is cutting across that portion of the drift.

Q. Did you see any northwest vein there, make any note of it?

A. I did. That is the one I described. Alongside of that gouge there was quite a little banded manganese parallel to the gouge.

Q. I know, but you did not in your direct, unless I failed to hear you, say anything about a northwest fault or fissure in connection with the gouge you found in the interior of the Rainbow vein on that level?

A. That was not an intentional omission.

Q. Have you a note of that?

A. I have. That gouge that I described as being 44 feet north of the south wall of the first vein I described has gouge, quartz and manganese parallel to it.

Q. Do you have any note of any northwest fissure there where the gouge is?

A. That has a 45° north west strike.

Q. Of the gouge?

A. Yes, of the gouge.

Q. Did you find any fissure there or was that gouge in your judgment made or could have been caused by the interior movement in the vein itself?

A. No, I don't think so there, because parallel to it there is banded quartz and some manganese.

753 Q. You would have—it would be nothing unusual in a vein of the magnitude of the Rainbow lode, in fact of a vein of any considerable magnitude, to have gouge or clay between the walls of the vein, in the vein itself, as the result of motion on the vein itself—in the vein itself, independent of any fissure?

A. It would be nothing unusual.

Q. And you do find such in the Rainbow lode at places?

A. I think it is probable. I don't recall any at the moment, but I think it is very probable.

The Court: Just before we leave this—if I understand you correctly on direct examination you describe- three veins in this crosscut?

A. I did.

Q. One which you call the Jersey Blue?

A. Yes.

Q. Then 24 feet beyond that another vein?

A. Yes.

Q. And then a mineralization that you say is the Rainbow?

A. Yes. Well, the first——

The Court: Is that the way you testified; that is the way the court understood you?

A. I should have to have the testimony read to be quite certain.

The Court: Is that what you intended to testify?

A. Yes, except this. That I intended to include the vein which had the north dip as a portion of the Rainbow lode.

754 Mr. Dickson: So then you mean to be understood as saying that there are but two veins disclosed north of station 18, one which you regard as the Jersey Blue and the other as the Rainbow.

A. That is my intention.

Mr. Gray: There was another one which you described which was still farther south though, in the drift. I think perhaps——

The Court: I understood the doctor to testify first, describing the Jersey Blue vein, then he said that north 24 feet of the north wall of the Jersey Blue is another vein which as I understand it, he described as about four feet in thickness; something like that.

The Witness: Might I be permitted to approach the court?

The Court: Yes, sir.

The Witness: I think I can make this more clear to your honor by showing the plot. This is the first vein which I described, this is the second, being a portion of the Rainbow lode——

The Court: I understand now, but you didn't state in your direct examination that it was a portion of it. I wanted to get it clear.

The Witness: I meant to.

The Court: I think I understand it.

Mr. Dickson: How far back from the face of the 1701 crosscut on the 1700 level, as it was last evening when you were there, did you encounter what you regard as the Jersey Blue vein?

755 A. I can't answer that question because I didn't measure the actual face. I measured—at least I took surveyor's measurements out to the other point. I didn't take the distance myself.

Q. Well, from the data you have there, professor, you can give us the distances of course from the north wall of what you regard as the Jersey Blue vein to the face?

A. I can't do that because I don't know just how far in the face was there; I didn't measure; there were two machines working in there.

Q. You w[illegible]t—you were into the face last night?

A. I was into the face, yes.

Q. And you have got the distances from point to point from what you regard as the Jersey Blue vein to the face?

A. I have marked these on the map but I did not take a measurement from the last mentioned gouge to the face. I know it goes beyond that, but how far I don't know.

Q. How far, so far as your measurements extend, had that crosscut proceeded in a northeasterly direction beyond what you regarded as the Jersey Blue vein?

A. From here to the face.

Q. You say you did not measure clear to the face but you did give distances between the Jersey Blue vein before you came to the footwall of what you regarded as the Rainbow?

A. Yes.

756 Q. What was that distance?

A. That is from the south wall of the first vein encountered which I considered to be the Jersey Blue to the north wall of that bounding vein that forms the south side of the Rainbow is 24 feet.

Q. And from that point on to the other seam you have here in the Rainbow is how far?

A. I would have to figure that—20 feet.

Q. Making a total of those two?

A. Of 44 feet.

Q. And how far beyond the last point in your judgment was the face?

A. Well, it might have been 20 feet; might have been 25.

Q. Somewhere about 20 feet, you think?

A. Somewhere in there, but I am quite uncertain about it.

Q. That would make it in the neighborhood of some sixty feet, all three together?

A. Approximately so.

Q. Then the crosscut had extended beyond what you regarded as the Jersey Blue vein?

A. It had.

Q. Do I understand that you were never in that crosscut until last evening?

A. I have not been in that crosscut until last evening, as well as I recollect. As I say, I was in it once with Mr. Winchell, in the 1600 and the 1700 Elm Orlu levels, in September last, and I went out the crosscut, walked out one of the crosscuts, whether it was

757 on the 1700 or the 1600 I don't recall, but I took no observation.

Q. And you are not prepared to say that you were never in it until last evening?

A. No, I would if it were not for that recollection; I should have definitely stated I had never been in it until last night.

Q. You were first called to the witness stand, professor, on the 20th?

A. On the 20th?

Q. Yes.

A. I don't remember.

Q. I think the record will show that?
A. I think the record is correct.

Mr. Kremer: Day before yesterday.

Mr. Dickson: Whatever day it was, if it was the 20th you were called on direct examination?
A. Yes.
Q. Now, is it not evident to you, from the distance this crosscut is now driven beyond what you regard as the Jersey Blue vein, that that vein must have been encountered in that crosscut before you went upon the witness stand?
A. It may have been so.
Q. May have been so?
A. I don't know absolutely.

Q. Judging from the distance this is only the 23rd, you
758 think that sixty feet could have been driven in three days?

A. I have no knowledge of whether it could or not; I am not an expert on mining, but it seems to me it could not; that would be my judgment.
Q. When you testified about this Jersey Blue vein or about the crosscut being run to encounter or in search of the Jersey Blue on the 1700 foot level, you were testifying from what somebody else had told you and not from any personal knowledge evidently?
A. I don't quite get the—when I testified about the Jersey Blue—could I ask you to kindly read the testimony, Judge?
Q. Yes, I will do so.
A. I don't recollect exactly what I said there.
Q. (Reading:) "Q. Has the Jersey Blue vein been developed below the Rainbow and to the south of the Rainbow after it has entirely passed through the Rainbow on the dip? A. I haven't personally seen nor have we any of us seen the Jersey Blue after it has cut through the Rainbow lode on the dip." So, when you gave that testimony, it was your understanding certainly was it not—by that you meant none of your associate experts had at the time you were testifying seen the Jersey Blue vein on that level after it had cut through the Rainbow?
A. I hadn't seen personally the Jersey Blue on that level and——

Q. I will read again:
759 A. I remember it as you read it. And so far as I had positive knowledge none of our experts had personally seen it. I was going—I would like to say that in that second clause of my answer there I might have put a qualification to that statement.

Q. I will read the whole—the other witnesses, neither Professor Winchell nor Dr. Winchell or Mr. Greene or Mr. Weed, or any other expert of the Elm Orlu company had communicated to you before you went on the witness stand the fact that that Jersey Blue vein had been encountered in that crosscut or that he believed it had been encountered in the crosscut.

A. None of these gentlemen named communicated to me that that vein had been cut in that crosscut or that they believed it had been so cut, but——

Q. Well——

A. (Continuing:) Allow me to complete.

Q. Certainly.

A. I had heard a rumor to the effect that the Jersey Blue vein had—or a vein had been cut which might be called the Jersey Blue vein. By "rumor" I mean something which somebody else told me about—that someone else has told them about something.

Q. Any of the experts on your side of the case on the Elm Orlu side of the case?

A. I can give you the exact individuals if you care for them.

Q. That will do, yes.

760 A. Mr. Winchell told me——

Q. I don't care what he told you.

A. That Mr. Finley had told him that they had cut a vein on that crosscut which he thought—Mr. Finley—might be the Jersey Blue, but it was a rumor.

Q. I will read further from your testimony: "I have not personally seen, nor have we any of us seen the Jersey Blue after it has cut through the Rainbow lode on the dip, but we are now driving on the 1700 foot level of the Elm Orlu a crosscut which should reach that Jersey Blue after it has passed through the Rainbow lode.

"By the Court:

"Q. Would that be after this trial is concluded or before?

"A. Probably in the next few days. It should strike it at any moment."

A. Yes, sir.

Q. So, when you gave that testimony you must have been of the opinion that it had not yet been encountered in that crosscut?

A. No, sir; I don't think that is a just inference from that statement. I had heard a rumor that would not have been accepted in testimony. I should probably have qualified that statement of the second clause of my answer, and said to my positive knowledge none of the rest of them had personally seen it.

(Witness excused.)

761 *Testimony of Fred Searls, Jr., Recalled.*

FRED SEARLS, JR., recalled on behalf of the plaintiff, testified as follows:

Redirect examination.

By Mr. Gray:

Q. Mr. Searls, last evening in speaking of the night that you had been on the 1700 crosscut, you referred to it as the night of the 19th; what was the fact?

A. Well, it was the 20th instead of the 19th; I made a mistake about that.

Q. After the adjournment of court last night, did you visit the 1700 crosscut?

A. Yes, sir.

Q. Will you state what you found and what conclusion you reached in connection with your examination there, and in that connection if you desire you may use the 1700 Elm Orlu plan map, Exhibit 26, and section 6, Plaintiff's Exhibit 31.

A. I visited that crosscut last night in company with the gentlemen who have just testified, and I may say that I agree with them that at the point 128 feet from station 18 there is an excellent vein across the crosscut of the dimensions of about three to four feet, carrying a good blue gouge on either wall, and accompanied, particularly on the south wall, by a considerable thickness of quartz and manganese and zinc and lead sulphides and pyrites, which as shown on Section 6, plaintiff's Exhibit 31 is in the position in which the Jersey Blue vein should be encountered, and which in all of
762 its characteristics appears comparable with the Jersey Blue as it is seen elsewhere, and which I believe to be the downward extension of the Jersey Blue at a point below the Rainbow lode.

Q. The other mineralization that you saw further in, will you describe that?

A. Going northeasterly in that crosscut, after passing through this Jersey Blue vein one goes through about 20 feet of granite without any mineralization whatever, and then encounters another slip or small gouge, and beyond that the granite in the crosscut is rather full of manganese stringers, particularly manganese, with a small amount of quartz, and that is rather more profuse toward the face, and I think it is probable that that whole mineralization represents the bounding fringe of the Rainbow lode. We have turned the crosscut due north now, so as to cut the Rainbow lode more rapidly, and I expect that it will shortly show sulphide minerals and more commercial ore. The part of the Rainbow lode that has thus far been encountered is not commercial ore; it is the lean material in the boundary.

Q. Is it usual to find those fringes of manganese on the Rainbow before you get into the commercial ore?

A. Yes, that is very usual.

763 Cross-examination.

By Dr. Dickson:

Q. You found manganese in the Jersey Blue vein too, did you not?

A. Oh, yes.

Q. You say that what you regard as the Rainbow lode in that crosscut does not contain any commercial ore?

A. No.

Q. Does it contain anything that carries values to your knowledge?

A. Yes, there are small quantities of zinc sulphide in connection with some of the manganese and quartz, but nothing that would even approximately pay to do any work on.

Q. When were you in that crosscut last before you went upon the stand?

A. On the night of the 20th.

Q. When last prior to that according to your notes have you been in this crosscut?

A. Well, probably a week.

Q. Can't you refer to your notes and tell us more definitely than that?

A. No, sir.

Q. Haven't you a note of your visit there?

A. No, sir; I have explained that my connection with that crosscut has been that I have had charge of trying to get it driven in rapidly.

Q. You were interested in it?

764 A. Yes, interested in driving it.

Q. You were interested in the purpose for which it was being driven?

A. Yes.

Q. And weren't you giving fairly constant attention to it—I don't mean every hour, but every day or two?

A. Giving attention to its being driven, but not giving any attention to the mineralization exposed in it.

Q. Mr. Searls, have you no note of the last visit that you made to that crosscut prior to the evening of the 20th?

A. No. I might be able to recollect it. I can only say that it was at least a week before.

Redirect examination.

By Mr. Gray:

Q. Mr. Searls, you were going to say something when Judge Dickson interrupted you, as I understood, about your connection with that crosscut?

A. Yes. We have had rather a hard time driving that. We were making good time there, about twelve feet a day, when the engine on the 1200 broke down, and the big skips won't go down to the bottom level, and as we were anxious to get that crosscut in, we began piling the muck back in the crosscut, and I went down there on the night of the 20th to see whether we could not store a little more muck on the station and make better time in spite of these difficulties, and that was all I did in the crosscut that day.

765 Q. What have you been doing for the last week or ten days that has interfered with your more constant attention to the work of the mine?

A. Well, I think that needs a little apology. I have not been in these recent workings because I have been busy getting the exhibits ready, which were delayed.

Q. Both day and night during a large part of the time?

A. Yes, sir.

Recross-examination.

By Mr. Dickson:

Q. About how many days or weeks have you been delayed in the work of driving that crosscut because of the trouble with the engine?

A. The engine broke down just about a week ago.

Q. What has been the daily progress since you had that trouble with the engine; how many feet a day?

A. Well, during the time that engine was broken down we made about thirty feet, and since that we have made——

Q. How much a day?

A. Well, some days we did not make any. We only got in about——

Q. Well, I want you to be as definite as possible about this; was it a week ago that you first had trouble with the engine?

A. Do you remember, Mr. Winchell, when the engine broke down?

708 Mr. Winchell: Yes, I think it was a week ago tomorrow.

A. I think it was last Sunday.

Q. Has that trouble continued since?

A. Until they got the engine repaired on the night of the 20th.

Q. So that between Sunday and the 20th what was the daily progress?

A. The average daily progress would be about 7 feet.

Q. It was from Sunday the 17th till the 20th that you were broken down?

A. Until the night of the 20th.

Redirect examination.

By Mr. Gray:

Q. How many machines were working there——

The Court: Gentlemen, the material point in all of this seems to me what is in there, not how they did the work.

Mr. Gray: Yes, your honor.

(Witness excused.)

767 *Testimony of Horace V. Winchell, Recalled.*

HORACE V. WINCHELL, after being duly sworn as a witness for plaintiff, testified as follows:

Direct examination.

By Mr. Gray:

Q. Please state your name and residence?
A. Horace V. Winchell; Minneapolis, Minnesota.
Q. What is your profession?
A. I am a mining geologist.
Q. Will you state what training you have had for the practice of your profession and what general experience you have had in its practice?

A. I graduated at the University of Michigan 26 years ago. After graduation I became assistant geologist upon the Minnesota Geological Survey. During that time I made an examination of the iron ore districts of Minnesota and collaborated in the publication of a report upon the iron ores of Minnesota, a somewhat pretentious report for those days, and published the first report upon the Mesabie Iron Range, which has since become the principal iron ore producing district of the world. After my connection with the Geological Survey, I took charge of the explorations upon the Mesabie Iron Range for the Minnesota Iron Company, having charge of those explorations for about two years. In 1894 the panic put an end to the explorations which I was conducting, and I engaged in general practice as a mining engineer and geologist, having a chem-
768 ical laboratory in Minneapolis, and examining mining properties wherever I was called upon to go. During that time I made examinations throughout the western portions of the United States and in the Lake Superior region. In 1898 I came to Butte in the employ of the Anaconda Copper Mining Company, and engaged in the study of the Anaconda and Colusa-Parrott mines, in connection with some mining litigation in which, for the first time in this camp, I think, the Blue vein series was discovered, developed and proven. Later my operations extended to the study of the mines of the Amalgamated Copper Company, or the companies which it controlled. I organized and established the geological department of the Anaconda Company and its allied companies, and for eight years remained in Butte, engaged in that work. During that time, however, I made occasional examinations of mining districts and mining properties in other parts of the country, in Alaska and in Mexico. After 1906 I was geologist for the Great Northern Railway Company until 1908. Since 1908 I have been engaged in general work, examining mining properties, consulting and advising in regard to the development of mines and their value in different portions of the United States, in Colorado, Utah, Arizona, California, Idaho and Montana. I have made examinations in British Colum-

bia, in Ontario, in Alaska, in different portions of Mexico, in South America and in some portions of Europe.

769 Q. Are you engaged in any literary work along geological lines, or have you been in the last few years?

A. I have not been so active in that work as some of my colleagues present in this room; Professor Irving particularly, and Professor Emmons also.

Mr. Dickson: I object to that as immaterial. Mr. Irving has given his qualifications. I don't care for any additional bo-quets.

Mr. Kremer: Further, the fact that a man writes a book about a subject is not evidence that he knows about it.

The Court: Proceed.

Q. Now, Mr. Winchell, you have referred to the Butte camp and your having been here for eight years steadily. Will you particularly refer to your acquaintance with the general geological conditions here and the importance of the camp and just generally and study which has been given to the structure here?

A. Before proceeding to a direct description of the properties in question, I should like to make a few remarks as to the district. During the past 17 years I have been familiar with its development. As a contributor to the metallic wealth of the world, Butte has no rival. From an area of about six square miles it has produced twice or three times as much value as the Comstock lode. It is the leader in copper production; it is well in front in silver production; and it contains some of the most productive and important zinc deposits now being worked. Important, thus, commercially, it is also

770 important and interesting to the geologist. Unique as to the extent of its vein formation and mineralization, it has invited and received greater study, more careful geological investigation than any mining district with which I am familiar. Seventeen years ago very little was known as to the geological structure and relation of the Butte camp. Each mine operated independently of its neighbor; its problems were unsolved, as they might have been by conference and correlation with adjoining properties. Every mine was to be investigated solely in the light of the information afforded by the developments in its own workings. The careful week by week and day by day investigations underground, however, have resulted in the accumulation of a fund of definite, well digested, absolutely reliable information regarding its veins, their structure, and their relation to each other, and it is now possible to approach the study of a particular property fortified by the information general throughout the camp and known to all of its students. The structure is not only visible upon the surface in the light of these later studies, but is also exemplified throughout the length and breadth of the camp to a far greater extent than ever before. At the time of my first examination, for instance, no considerable mining operations were in progress upon the Rainbow vein. Silver mining had declined; everybody was looking for copper. The relation of the copper veins to the silver veins was not ascertainable, and it was believed that they

771 belonged to entirely different systems and periods. With the discovery of the blue vein systems, the veins extending to the northwest, developments progressed northerly, and finally these northwest blue veins were carried until they encountered and passed into or through the great Rainbow vein, and then for the first time the true relation was established. These blue veins, which I will refer to later, had not been developed at all, or if so, had not been recognized at the time, in 1898, '99 and 1900. Later they proved to be important contributors to the production of the camp.

Q. From all of this study which you have described and knowledge concerning the vein structure of the camp, are there any definite well known systems of veins, and if so, where are they?

A. There are definite well known systems of veins, veins whose relations have been developed in thousands of places. The systems have been briefly referred to here, and I shall only refer to those which are disclosed in the workings of the Butte and Superior and the Elm Orlu Mining Companies and adjacent properties. These systems, in the order of their formation, or chronologically, are, first, the east-west system; second, the northwest-southeast or Blue vein system; and third, a fracture system which is little, if any, mineralized after its formation, which in this ground is represented by one principal structural break, known as the Black Rock
772 fault. The first system of veins is represented by the Rainbow lode, one of the most striking and first worked veins in the Butte camp. This vein is what may be called a compound or linked vein. Traceable upon the surface for a distance of more than one mile. It early attracted attention, because of the prominence of its outcrops, the obviously mineralized nature of the quartz, and because it was apparently the source of the placer minerals, the gold which had been followed up Missoula gulch and other gulches to it. It occurs in a series of more or less disconnected, but intensely mineralized strands, or lenticular masses of vein material. In the upper levels there were important quantities of silver ore. The veins are largely composed of quartz and the pink carbonates and silicates of manganese, rhodochrosite and rhodonite. Upon the surface these minerals are much oxidized and iron stained and blackened, so that the rock is black, and I suppose the name Black Rock was derived from the appearance of the oxidized cropping of the Rainbow vein. Extending in a direction slightly north of east, this Rainbow lode can be traced by outcrops, caved stopes, old shafts and pits, as shown upon Plaintiff's Exhibit No. 52.

In its general strike, in a course slightly north of east, the Rainbow lode exhibits occasionally one or two principal strands and again three or four lying side by side or overlapping. It cannot be believed that in all cases the lack of connection or continuity
773 between these lenses or strands of the Rainbow lode is due to faulting. The vein or lode is entirely mineralized in shoots which were not all developed along the same precise plane of movement or line of the vein. In general, however, there is a rather definite boundary to the branches or lenses or lenticular masses; they do not extend indefinitely away from and beyond the lode.

They come to a rather sharp and sudden termination. Sometimes, along their course they are interrupted by faults. These faults sometimes course along the margin and sometimes because of their direction—their relation in direction to the strike of the Rainbow—cut directly across. Where the faults intersect at a relatively large angle with the strands of the Rainbow, the relation of faulting is obvious. Where these faults intersect at acute angles it is less easily ascertained. The composition of the Rainbow as a vein, is, as I have said, largely quartz and manganese near the surface, and in the upper levels. It, however, contains important quantities of zinc. It is also full of other sulphides, some granite, some pyrites, some chalcopyrites and contains fluorite, the purple fluorite, fluor-spar. It is accompanied by zones of considerable alteration of the granite. Within the strands or between the lenses of the Rainbow the granite is frequently very much altered and brought to the condition exhibited in sample S-1. That character of granite, intersected by small seams of quartz and mineral, softened and containing additional quantities of manganese, frequently shown on analysis,
774 but not always visible to the naked eye, is considered a portion of the lode. Thus, upon plaintiff's exhibit 4, the masses of granite included within the lode marked red on this exhibit must be considered portions of the lode itself, horses within it. The next older, that is the one that is not quite so old as the Rainbow vein, is known as the blue vein series. The blue vein series is a system or series of veins which course through the country in a generally northwest and southeasterly direction, varying from north 25 or 30 degrees west to north 75 or 80 degrees west. South of the Rainbow lode these veins have an average course of North 50 west. As you approach this lode they will be seen inclining a little more westerly. That is a constant feature of the blue veins of this camp. These veins are marked by singular continuity; they are narrow, never approaching in their width the dimensions of the Rainbow; they are not continuously mineralized, the ore or mineralization occurring in shoots both horizontally and vertically distributed with long stretches of unmineralized material, crushed granite, between. They vary considerably in their thickness. A vein fifteen feet thick or twenty feet thick may narrow to one of six inches and sometimes upon their strike or continuity, especially when passing through the older veins, are rather difficultly ascertained. The precise point of the crossing is not always obvious. A fissure may be perfectly plain and distinct
775 for a distance, and then become obscure, to illustrate which I have a sample. Sample marked "W-3" shows a plane of movement, a fissure with well developed marks of movement and striations passing into a cemented mass of crushed quartz, where that fissure can hardly be detected. Such occurrence is not infrequent. If, however, at two points along the strike and with a general uniformity of dip and conditions we find such a fracture and at some point between there is a certain obscurity, if we know to what system that fissure belongs and what is its general character, we are justified in assuming the continuity of that fissure through the point of obscurity. In another respect the blue veins differ from the Rain-

bow. They are watery veins. They are almost invariably marked in the mines by mud, by caving ground, by crushing timbers and by dripping water. The veins are darker colored in general; they are more intimately banded. There is a more direct connection between the banding of the veins and the walls than there is in the larger masses of the Rainbow vein. These northwest-southeast blue veins usually dip to the south or at a steep angle may be flatly to the north. The faulting movement is in general in the same direction; that is they are left handed faults. Proceeding along the vein westward to the fault it is necessary to crosscut to the left, going east it is again necessary to crosscut to the left to find the faulted portion or segment of the vein. These veins are important producers of copper
776 and they have been developed to great depth. In another respect they differ from the Rainbow and that is in the nature of their outcrop. The blue veins, because they are not continuously mineralized as is the Rainbow, but only in shoots, have long stretches on the surface where there is no quartz, where the veins have been worn down equally with the granite and the cropping can be traced with great difficulty. They frequently are smaller near the surface. I have seen such veins six inches wide upon the surface develop continuously to a depth of two thousand feet, widening slowly but gradually as depth is gained, precisely in accord with the old miner's idea of all veins, and upon the 1000 or below containing important deposits of ore, while above the 1000 nothing of any value could be found. In other words, the blue veins are typical fissure veins. The Rainbow vein is of a peculiar type of vein and is not a typical fissure vein. The last system of fractures in that area is represented here by the Black Rock or Poser fault. This system of fractures has occurred later than the other two mentioned and has faulted both of them. It is seldom, although occasionally, accompanied by endogenous mineralization but never becomes of importance as a producer of ore. I think I have answered your question.

Q. Before you leave that. You stated that in some places the evidence of faulting is somewhat obscured, where the northwest end of the series cut the older veins. Now, what is the fact with
777 reference to the identify established between two veins where there is one definite, known developed place where the faulting can be shown?

Mr. Dickson: Of course we will admit that if it is demonstrated that one vein faults another in one place it would determine that it must have been a younger vein.

Mr. Gray: All right; no need to go into that.

A. I did not explain that along some of these disconnected strands or lenses of ore in the Rainbow a fault may be found passing along one side or one edge or cutting across one corner of that lense, and there may be no faulted portion whatever anywhere to look for because there never was a continuation. The fault happened to pass along the plane of movement established at the walls or existing at the walls of this particular lense or strand of the vein. Any fault passing through the country strikes upon pre-existing planes of

weakness, and a fault coursing in general alongside or across the end of one of these big lenses of quartz will find the plane of weakness upon its walls and will take up and follow that plane of weakness so far as it may, in its general direction, and when you find that fault existing at that place, there is no presumption that there must be another faulted portion of that lense, because that may have been the termination of it at the time the fault coursed through the country.

778 Q. Can you indicate that upon any of the plans or upon the surface?

A. I think it will be illustrated in the model.

Q. Mr. Winchell, coming definitely to these two claims, what was your first acquaintance with the Black Rock or Elm Orlu claim?

A. I don't recall the first time that I crossed this ground, these claims. It was more than ten years ago I made the first examination of these properties in their underground workings, in 1898.

Q. First, with reference to the——

A. I am mistaken; I will have to move that ten years farther down to 1908.

Q. First, with reference to the surface, did you see on your first inspection, the first time you were over the surface, the outcroppings of the Rainbow lode on either the Elm Orlu or the Black Rock?

A. Yes, sir. After the discovery and development of the Edith May and Jessie veins of the North Butte Company I somewhat carefully studied the surface of the ground to the north and west of these properties, and in connection with that study of the surface I traced the outcrops and had the corners located of some of these claims, even doing some trenching, for the purpose of determining the precise position of the outcrops of the northwest-southeast veins, not being interested at that time in the Rainbow vein. But I noted at that time the Rainbow cropping coming down into the Poser and showing near the eastern portion of the Poser a particular

779 cropping of quartz extending across the Elm Orlu surface to a point about south of the southeast corner of the Jersey Blue. The continuation of the Rainbow lode across the Black Rock was somewhat obscured because of a deep gulch or ravine existing at that point, but further to the northeast the croppings are again well exhibited.

Q. In connection with these veins have you traced the Jersey Blue upon the surface at all?

A. Northwesterly to about the region of the Jersey Blue shaft and a little beyond, as exhibited upon plaintiff's exhibit 4.

Q. Continually departing from the Rainbow?

A. It is regular in its strike. It departs in that direction from the Rainbow vein, the Rainbow vein striking north of east and the Jersey Blue north of west.

Q. You have spoken of the Rainbow being faulted and having observed faults in the Rainbow. What is your observation concerning faults of the Rainbow?

A. The Jersey Blue as developed in workings of the Black Rock and Elm Orlu mines is continuous without faulting, with the single

exception of the interruption by the Black Rock fault. It is remarkably free from interruptions as compared with the Rainbow; and if it had been subject to the same amount of faulting as has the Rainbow, because of its much less thickness, it would have been displaced and offset in a great many places where we now find it continuing directly and uninterruptedly through the work-
780 ings.

Q. You have spoken of the Jersey Blue as being later than the Rainbow and as faulting the Rainbow. Will you state what observations you have made that show to you that the Rainbow lode is faulted by the Jersey Blue, both upon its strike and upon its dip, that is what you saw of it beyond the Rainbow—both upon its strike and upon its dip?

A. The relation between the Jersey Blue and the Rainbow is clearly and undoubtedly, to my mind, without any question whatever, established at two or three points. The first development which was made for the purpose of ascertaining the relation was a drift upon the 700 foot level south of the Black Rock shaft to the northwest, for the purpose of ascertaining as to crossing or joining with the Rainbow vein at that point. The Jersey Blue vein on this level consists of about eight inches of quartz and manganese and some crushed granite and clay gouge with rather steep dip. That is shown on the crosscut south from the shaft. Drifting westerly upon this Jersey Blue vein the vein changed its dip from north to south, both at a steep angle, however, and at a point about one hundred forty feet westerly from the crosscut the Jersey Blue vein encountered the Rainbow vein material upon the south side of the drift and for the next nine or ten feet upon the north side of the drift was granite. In other words, we were following a fissure directly across the end of the Rainbow mineralization. The offset there is
781 measured at various places. It differs slightly on the level and in the stopes, but in the stopes above this level the intersection is easily, clearly established. Having once definitely determined at that point the relation between the Jersey Blue and the Rainbow, other developments were made in the explicit—in explicit and entire confidence that the Jersey Blue would be found where we looked for it, and we have not been disappointed.

Q. That particular place you have reference to is represented by the sketch of Mr. Searls back of the 703 stope?

A. It is exhibit 51.

Q. That accords with your observation there, that sketch?

A. Yes, sir. At various points in the stopes, in the crosscuts and in the workings the Jersey Blue can be seen faulting the main portion of the Rainbow. Another place where the relation is clearly established, but where the faulting was of the Pyle branch of the Rainbow instead of the main strand, is upon the 1100 foot level south from the Black Rock shaft and easterly. Upon this level the Pyle branch of the Rainbow, having a thickness of eight or ten or twelve feet, was followed easterly until it turned up and bent around against the Jersey Blue wall. The Jersey Blue vein at that point can be seen clearly cutting across and passing between the intersected

ends of the Pyle branch, and a short crosscut to the north
782 has passed through the Jersey Blue and exhibited the extension to the east of the Pyle branch.

Q. Where is that with relation to the Black Rock fault?

A. That is upon this level about 135 feet south of the Black Rock fault.

Q. And where with reference to the south wall of the main Rainbow—I mean is it south of the main Rainbow, beneath the Rainbow as it shows there?

A. The Pyle strand of the Rainbow goes westerly, is separated from it by a horse. As we go easterly the mineralization has become more or less continuous all the way across and at that point we have practically a junction on strike to the east around this horse of granite. But the displacement at that point of 7 or 8 or 10 feet, depending on whatever——

Mr. Dickson: What is that?

A. It is impossible to determine exactly, but the drift east comes to the point where the quartz and manganese turn to the north and curl up against the Jersey Blue vein and upon the east side of the Jersey Blue fissure at that point is clear, solid granite. Another place where the Jersey Blue can be seen faulting the Rainbow vein is in a drift which I think is 456, of the Black Rock shaft. It is west from 451 crosscut. Here we have the relation——

Mr. Dickson: I wish you would indicate it on the map or levels?

783 A. Here the relations are clearly exhibited. The drift was extended to the westerly along a small fault vein. It encountered the intersected part of the vein of the Rainbow vein material which rapidly widened as we went west upon the south side of the drift and opposite on the north side was again the country granite. In the face of the drift we encountered the Black Rock fault and a short drift has been extended to the southwesterly along this fault in the Rainbow vein material, but showing the fault clearly in the face. A little picking in the north face of the drift shows the Black Rock fissure continuing northeasterly beyond the end of the Jersey Blue.

Q. Mr. Winchell, can you point out some places north of the Black Rock fault, take for instance the 800 foot level, where you observed this same thing?

A. Upon the 800 Elm Orlu level on drift 808, as shown upon plaintiff's exhibit 13, the Jersey Blue vein in its course to the east intercepts and passes along at a very acute angle the north wall of the Rainbow vein. The vein material is good ore at that point, zinc or heavy quartz, and can be seen lying against the gouge of the Jersey Blue. A little farther to the east, at a point about 105 feet east of crosscut 821 the heavy, tough clay of the Black Rock fault can be seen crossing from the south to the north side of the drift and terminating the Jersey Blue at that point. But one of the most impressive and convincing points at which to determine the
784 relation between the Jersey Blue and the Rainbow vein is at crosscut 1416 which is a new crosscut not shown upon this model.

Q. Is that Elm Orlu or Black Rock?

A. Black Rock. Here the Jersey Blue at a point 29 feet south of the drift, with a thickness of more than ten feet, is seen where it has passed through the Rainbow vein upon the dip from the north side to the south. If a raise were started up on the Jersey Blue in crosscut 1416 and should follow it continuously to the surface it would pass through the Rainbow vein from the south side here and come up in the Black Rock tunnel upon this same vein on the north side. That, to my mind, in relation to the other information we have as to the position of the Jersey Blue in that vicinity, is absolutely convincing.

Q. Were you able to observe the differences in identity of these veins over in the westerly portion of the Black Rock lower workings?

A. The Jersey Blue vein can be seen distinctly passing through the Rainbow, having the ordinary structure and thickness and crushed quartz material in its filling, with its gouge more or less replaced by mineral upon several of the levels, and in several of the stopes, some of which are now inaccessible. One point is upon the 1500 Elm Orlu sill about 65 feet north of transit point 47.

There the Jersey Blue is easily and definitely seen cutting across the main Rainbow vein. I have again seen what I believe
785 to be the Jersey Blue vein—I have seen the Jersey Blue vein after it has passed through the Rainbow vein on its dip upon the 1700 foot level of the Elm Orlu shaft. Its position, its strike, its dip and its filling correspond closely with what can be observed elsewhere in the Jersey Blue vein. Sample W-4 is a sample—a specimen of the Jersey Blue vein material from this level, 128 feet north of transit point 18. This specimen well illustrates two or three things which are of interest in this connection; it shows in the first place pink manganese, fluorite, more or less quartz, galena and zinc; it shows the banding; it shows the movement and it shows another thing, namely the partial replacement or mineralization of the gouge, showing that this gouge was a part of the vein before the mineral was introduced, and has now been to a certain extent turned into very fair ore, the darker portion of this, indeed, representing gouge almost turned into solid ore.

Q. Do you observe that elsewhere in the Jersey Blue in the upper workings, the gouge replaced in places with ore?

A. The gouge is almost always mineralized to a certain extent, but we do not always find it turned into ore.

At this point on the 1700 foot level the Jersey Blue vein is separated from the Rainbow vein by about 20 feet of unmineralized granite, a very fresh article of granite. That I believe to be the south wall of the Rainbow, although at that point it has not
786 precisely the average strike; but that is easily understood if we look at the changes in strike of the boundaries of these various lenses of the Rainbow vein material. We may have a strike northwest and we may have a strike southwest, and around some of the ends we may even have it north and south. That material consists, as is shown by Sample W-7, of pink manganese and quartz, dipping north at a high angle, and marking the separation between

the unmineralized granite on the south and the stockwork of quartz and manganese to the north. Another sample, W-6, represents the stockwork material, stringers of quartz and manganese enclosing altered granite.

By Mr. Kremer:

Q. Where was No. 6 found?

A. Within a few inches of W-7, just on the north side. I can give you the exact position if you like.

Mr. Kremer: No, that is near enough.

The Witness: These are only illustrations or examples of places at which the relation between the Jersey Blue and the Rainbow vein may be determined. They are typical; they are the best; but there are many other places where, with this information in mind, and knowing the habit, the accumulated amount of information which justifies the presumption that that vein faults the older vein and is absolutely certain to fault it always.

Q. Just one more place before you leave this that I would like to ask you about. Have you been up the raise from the 1504
787 Elm Orlu; do you recollect anything about that?

A. Yes, I have been up this, but it is a long time ago, and I have not in mind the precise appearance.

Q. Before we leave this question of faulting, I want you to turn to the tunnel map, showing the Black Rock tunnel. There is shown there in horizontal section what would indicate an apparent displacement of the Jersey Blue by the Rainbow. Explain what in your opinion that is; it is near Stations 1072 and 1057?

A. The Jersey Blue vein is followed by a drift southeasterly from the Black Rock tunnel, until it is intercepted by and cut off by the typical characteristic tough clay gouge of the Black Rock fault. In cross cutting south through the country to find the southeastern segment of the Jersey Blue in that vicinity, we passed through vein material, more or less oxidized, and we expected to find the Jersey Blue just where we did find it, and we then expected to drift westerly and find it intercepting the Rainbow vein in the same manner that we did on the 700; but we found the Rainbow vein at that point enclosed within two planes of movement of the Black Rock fault, upon each of which there had been some movement, and we found the Jersey Blue there cut off by the Black Rock fault before it entered the Rainbow vein material. There is probably a small segment of the Jersey Blue cutting across that intervening wedge of the Rainbow vein material and lying at a point where it would not be
788 shown by these developments. There is granite upon that tip of the working just north of Station 1072. The red on this map extends a little bit too wide at this point. My notes show that that is a portion of granite which is south of the boundary of the Rainbow vein, and consequently there is no development to show that little slice of Jersey Blue which occurs between the ends and between the strands of the Black Rock fault.

Q. Mr. Winchell, there was one question which I perhaps should

have asked you earlier in your examination. You spoke of having examined these properties in 1908. Subsequently when did you next examine the properties?

A. In the latter part of 1913.

Q. From late in 1913 up to the present time, generally with what frequency have you visited these properties and observed the developments in them; what study have you given them in a general way, what length of time?

A. I cannot state the exact amount of time that I have spent, but I have directed the developments, and kept in touch with them and examined them at frequent intervals.

Q. During that time have you observed the gradual development which the workings put in by the two parties have shown?

A. I have seen most of those developments.

Q. Now, when you first undertook the investigation of the matter, what was the first thing which you did develop, and which
789 it became necessary to develop, and where was that development work constructed?

A. One of the first pieces of work was for the purpose of disclosing the relation of the vein upon which the Elm Orlu claim was located to its end lines and side lines. There was a contention that the discovery vein of the Elm Orlu crossed its side lines. Referring to Exhibit 6 the Elm Orlu discovery tunnel was run to a point beneath the discovery shaft, that point being now covered by a dump, and before that work was finished, a drift had been extended upon the vein, the Elm Orlu vein, the vein found in its discovery shaft, westward to and across the west end line of the Elm Orlu claim at a depth of about 50 feet beneath the surface. At a later period a trench was dug upon the surface at that point, disclosing the same vein at its actual point of crossing of the west end line. After this work was completed, or possibly before it had been entirely completed, we were requested to make certain drifts upon small fault fissure veins in a northwesterly and southeasterly direction, as shown upon the map Exhibit 6, and indicated as following fault veins by the blue coloring. The northwestern drift encountered some old workings upon a northern strand of the Rainbow vein. The next work with relation to the position of the discovery veins of these two claims was done in the Black Rock tunnel. It was my belief that the vein upon which the discovery shaft of the Black
790 Rock claim is located crosses both the north and south side lines of the Black Rock claim. Referring to Exhibit 8, a drift was made by the Butte and Superior people easterly and westerly from the Black Rock tunnel. The western drift, through a little raise to the Dewey tunnel, carried the vein westerly across the west end line of the Black Rock and into the Jersey Blue claim.

By the Court:

Q. Is that the vein which you term the Black Rock discovery vein? You said the vein.

A. I intended to say a vein. This drift east of the Black Rock

tunnel followed the Jersey Blue vein for a distance of about 55 feet, and then left the Jersey Blue vein and turned in a direction towards the discovery shaft of the Black Rock.

After reaching a station, what is now point 786, a crosscut was run to the north, a little drift extended east, another crosscut south to the drift was extended easterly from the north crosscut and stope, a little drift was extended on from there east from the middle drift and followed easterly in a ramifying direction its original course until it reached the bottom of an old shaft marked "old shaft" on plaintiff's exhibit 8. It was later turned to the southeast and connected with the discovery point. This drift—there is no number to the drift; it passes through stations 198, 800, 843 and 809—did not follow any continuous vein. It crossed the Rainbow
791 vein partially, stations 809 and 811, following along the south side of it and finally reached the discovery shaft, but there is a gap between the Jersey Blue vein as shown in the different workings west of station 199, and the Rainbow vein, and through that distance the drift passed through country granite for a distance of about 87 feet. After this drift was run I requested that the Jersey Blue vein be followed to the southeast commencing at the point in the Black Rock tunnel drift where it could be seen departing from the drift on the south side. This drift was extended upon the Jersey Blue vein, through stations 838, 836, 865, 1002, 850, and 1052, to the point where the Jersey Blue is intersected by the Black Rock fault. We were then requested to run crosscuts south from that drift, numbered here on plaintiff's exhibit 8, crosscuts 13, 16, 18 and 19. These crosscuts were extended south a short distance, some 25 feet, and disclosed the full width of the Jersey Blue vein. It is not very wide but in some places has a thickness of seven or eight feet; in other places of four or five feet. I have already described the crossing through a little crosscut which I had extended from the east end of this drift south to pick up the other segment of the Jersey Blue vein, which was there picked up at about station 1053.

Q. Did any of these little stringers that were followed northeasterly by the drift continue indefinitely in that direction, or did they fade out?

A. There are some small vein fissures which extend to the
792 eastward from the point where the Jersey Blue vein departed from the main drift for varying distances, from 100 to 140 feet. They cannot be followed, I believe, and have not been followed beyond that point. Whether all of these little fissures are part of the Jersey Blue, or whether some one or two of them may represent the little joint fillings of the granite in which there is frequently found a little zinc running in various directions I do not know.

Q. In other words, your conclusion, I assume it is your conclusion that the Jersey Blue vein follows from station 831 to 1052 along a drift driven by you?

A. It does.

Q. After that work what was the next point on or near the sur-

face at which the defendant performed some work with connection with the top of this vein, crossing the Black Rock?

A. In the Niagara tunnel from a point nearly underneath the discovery shaft of the Black Rock claim, drifts were extended eastward——

The Court: Just a moment. Is there any controversy as to what is the Black Rock discovery shaft?

Mr. Dickson: I infer so from the testimony of the witness.

Mr. Kremer: He hasn't identified it.

The Court: The court simply wanted to know if there was any issue there.

A. So far as I am aware the position of the Black Rock discovery is as shown by plaintiff's exhibit 6, I believe, which I last
793 referred to. I have no knowledge of any claim as to a different position. But I say that from a point nearly underneath it on the Niagara tunnel level drifts have been extended easterly upon a portion of the Rainbow vein running in the direction towards the northeast corner of the Black Rock claim. This portion of the Rainbow vein encountered a little fault of the blue vein type just east of survey point 1107. The vein is picked up again by going to the left as you go east on the opposite side of this fault, on the east side, and followed through an old stope and very clearly seen, having a considerable thickness, to survey point 118, where it was intersected and displaced by another northwest fissure, but from this point to the eastward the drift followed several small fissures cutting across diagonally from one to the other, some of these fissures having visible mineralization, but veins differing in magnitude and appearance from the vein which was followed to the point of cut at station 1118.

From these workings I draw the conclusion that the vein which crosses the west end line of the Black Rock claim does not extend easterly to the point of discovery; in other words that there is no vein extending from the point of discovery westward across the west end line of the Black Rock. I am further of the opinion that there is no vein continuously followed to the eastward from the point of discovery across the east end line, and that the discovery
794 point is upon a vein which crosses both side lines of the Black Rock claim.

The Court: Would it be at all material in this case as far as extralateral rights are concerned, whether or not the Black Rock vein crosses the east end line, since the Black Rock extends several hundred feet east of the Elm Orlu?

Mr. Dickson: There is one phase of the case which I think would make it material, your honor.

The Court: Proceed.

Q. The faulted segment of the Rainbow which was followed, in which direction do you believe it to have been faulted?

A. I believe it has been faulted in the usual direction, that is, to

the left as you go east, and that the faulted segment will be found somewhere upon the north side line or just north of it, in the Niagara claim, and running eastward into the Rainbow.

Q. Is this same Rainbow vein found there in the Niagara claim?

A. It is.

By Mr. Dickson:

Q. Which branch of it do you refer to, the southerly branch?

A. No, I don't find the southerly branch so that I can identify it anywhere east of station 1118. The northern branch is found beneath the Niagara.

By Mr. Gray:

Q. Mr. Winchell, you said something about these northwest veins having large bodies of copper minerals in them. As far as
705 you have testified, the Jersey Blue vein does not disclose copper ore bodies, and as far as developed, probably has zinc and some galena in it. Will you explain, if you can, to what reason you attribute the fact that it does not have the copper minerals, or if that means anything to you in determining the identity of the vein as belonging to the northwest series?

A. The northwest blue veins, like the east-west veins contain copper minerals in the central portion of the range. There is a center of copper mineralization, which fades out at distance inwards from that center. The east-west veins upon the border or margins of the range are characterized by manganese and zinc rather than by copper, so far as developments have gone; likewise the northwest-southeast fissures, at distance inwards from the copper area, carry more manganese and zinc than copper. Further development at greater depth, or more extensive developments at the present lower levels may disclose copper ore in the Jersey Blue, both southeast and northwest of the Rainbow. I should think the most promising direction in which to explore for copper would be to the southeast.

Q. There has been referred to a strand of the Rainbow known as the Pyle strand. Are you familiar with that?

A. I am.

Q. Will you state where that is and what it is in your
706 judgment, its extent along its course and where in your judgment the top thereof is and the manner in which it has been drawn up beneath the surface of this ground?

Mr. Dickson: I would suggest that I would be willing to admit that Mr. Winchell's testimony in respect to that, which I suppose will be the facts, will be corroborative of Mr. Searle' testimony. If he has anything to add of course that is different.

Mr. Gray: I don't know that that would be very satisfactory, Mr. Dickson. I am not going to spend very long on it, but I want him to describe it.

Mr. Dickson: Very well.

The Witness: I first say the Pyle branch of the Rainbow lode, as early as I can now recollect, in the crosscuts south from the Black Rock shaft upon the 700, 800 and 900 levels; probably on the 900 and 800 first. I observed its character, its position in the ground and its dip, and I had heard about a raise emerging from the stopes and going upward with a dip to the north, approaching the surface toward the south, below that point, and I requested some development upon this vein. A drift was extended to the eastward for the purpose of following this vein to ascertain its relation at that depth to the east end line of the Elm Orlu. That was drift 821. When this drift had run out according to the survey, upon which we relied, so as to reach the east end line of the Elm Orlu, I inspected the working, and I noticed that the main portion of the vein, or a considerable portion of it, lay to the north, and I requested a crosscut upon the east end line. There was a mistake in the survey—there were two mistakes in the survey. The crosscut was in the wrong direction, and the drift was in the wrong direction. I have in my hand in my note book the survey as first provided, and the corrected survey. This shows the crosscut as I expected to run along the east end line. That cross cut however instead of extending along the east end line, ran in a northeasterly direction; it is No. 25 upon the model; we should have followed the main portion of the vein, but we have only one of its smaller branches extending down to and practically crossing the east end line upon this level, shown in Exhibit 15. The instructions were to follow this vein easterly. It was followed by means of one of its branches, and the main portion of the vein continues further north.

Q. Who did that work?

A. That was done by the Black Rock Company at the request of the Elm Orlu.

Q. By the way, how was the development work of the two parties to the litigation conducted; you have spoken of repeated requests?

A. By agreement, and in a perfectly friendly and mutually reciprocal and cordial way; both companies performed development work for each other, charging up for the work, I suppose, that was done. I then requested that a drift be extended westerly, following the Pyle branch to a point beneath the 900 foot level, so that a raise could be made to connect, which work has proceeded but very slowly, because of the press of conditions in the Butte & Superior mine. At the same time that that drift was running, a raise was to be extended upward, and that was done, but it was through very hard ground, and the raise did not carry the material out rapidly, and work has been prosecuted very slowly. We hoped to be able to have that drift on the 800 Black Rock connected up with the 900 level. Meantime a drift on the Elm Orlu 900 has been extended somewhat eastward, but it was necessary, in order to reach that point there, to run a lateral, the old 950 foot level being badly caved, before the drift could be started eastward at all. A raise was continued upward upon this vein. The 900 foot level of the Black Rock was con-

nected with the 800. The 1000 was connected with the 900. Upon the 1000 level of the Black Rock the vein has a width of 18 feet.

By the Court:

—. You spoke a moment ago of this small branch practically crossing the east end line. What is your idea of small in that connection? I have heard you speak of five and seven foot veins as being small.

A. That was only a few inches, but the vein, the main portion of the vein was left by the drift.

On the 900 foot level there are six feet of solid quartz and
799 manganese and the vein has a width from seven to twelve feet. The vein followed upwards becomes smaller; it diminishes in thickness constantly and upon the 700 foot level of the Black Rock it is five feet in thickness with 20 inches of quartz. Above the 700 to the 450 it varies from five and a half to two and a half or three feet, and only a few inches of quartz; and above the 450 the vein continues to narrow until, upon the twelfth floor, there is from six to ten inches of clay and crushed quartz and at that point is encountered a faulting—no, I am mistaken. The six to ten inches is the material in the fault. We had from twelve to eighteen inches of crushed quartz and altered granite in the raise on the twelfth floor, which was then the top, and met a fault striking north 84° west with a dip to the south of 54°, containing from ten to twelve inches of clay and crushed quartz. That fault probably offsets the vein which is there very small and may be very difficult to distinguish above that point, but offset it to the south, the fault lying like that (indicating), and the continuation of the vein being farther to the south in the Elm Orlu if it goes on. So far as I know, however, the actual top of it is underneath that fault.

Q. Where would the top—have you connected it as much as you desire?

A. The Pyle branch has been followed westward on the 1100 foot level of the Black Rock, showing a strong vein with good walls, dipping northerly to—well, through drift 1106, to a raise whose
800 number is not given, which it—which carries it up to the elevation of the 1200 level of the Elm Orlu. Upon this level the vein is followed or is disclosed in a crosscut and followed southeasterly to practically a connection with the top of that raise. There is there a vein of from four to six feet in thickness, having the characteristic mineralization of the Rainbow, and in this crosscut we have a practical union on strike to the west with the main strand or portion of the Rainbow although the stopes continue westward to show a separation of the heavily mineralized portion, that is the ore. Toward the east upon the 1100 level of the Black Rock shaft the Pyle vein is followed for a distance of—I don't see anything to measure from—but out in drift 1141 to a point where it is displaced by the Jersey Blue, picked up again on the north side of the Jersey Blue and there connected towards the east upon strike again with the main, wide portion of the Rainbow. We thus, around this horse of

granite, which lies between the main strand and the Pyle branch, connect the Pyle branch of the vein from west to east.

Q. What workings are there above the point where you have stated it is your judgment the top of the Pyle vein will be found to this fault—against this fault which should have developed it if it appeared above that point, is it possible of identification?

A. For the purpose of finding the Jersey Blue vein southeast of the Rainbow, and the Pyle vein still farther south, the Clark
801 tunnel was driven starting in the side of the gulch northeasterly from the Black Rock shaft extending south across the country and connecting finally with the north crosscut of the east shaft. The Clark tunnel is marked and shown upon plaintiff's exhibit 8. From the east shaft on the 60 foot level a crosscut extended north and south across the Elm Orlu claim and the Pyle vein cannot be identified in this crosscut. Upon the surface farther to the west I, at an early date, noticed a vein in trench F-2. The precise strike of that vein could not be determined and nothing was done to develop it at that time, but it was a pretty good vein. I have two samples of quartz from this vein marked W-1 and W2, which show quartz ore oxidized, manganese oxidized, and galena. These samples I took myself from that vein which at that time——

Mr. Dickson: You are referring now, are you, Mr. Winchell, to the vein, shown or depicted upon exhibit 4 upon which tunnels F, G, H and K are found?

A. Found in trench F-2, that is on a branch of the Rainbow which extends southeasterly towards the east shaft and the east end line of the Elm Orlu.

Q. How far has that been developed on the surface, Mr. Winchell?

A. The quartz in that vein does not extend very much farther east. It is accompanied by a zone of whitened, softened, altered granite, with some mineralization, and can be seen in the
802 trenches as far east as trench "L."

Mr. Dickson:

Q. It does extend that far east does it not?

A. I think it does, yes, no quartz, just the zone of altered, softened granite which may probably contain quartz at a greater depth and which does contain quartz farther west along its strike.

Mr. Gray:

Q. From all of these workings, the workings upon the Pyle strand, up to the point where you believe it to be cut off, and from the workings above which have been extended for the purpose of developing it if it existed above the fault you have referred to, where, in your judgment is the top of the Pyle strand, beneath what claim and approximately where?

A. I believe that the top of the Pyle strand has been developed in the raise from 451 crosscut.

Q. Where, Mr. Winchell?

A. In the raise, from the 451 crosscut practically—well, twelve

floors above the crosscut and that the vein in its course easterly and westerly terminates upwards against this fault for an undeveloped and unknown distance, but its strike at that point is such as to carry it across the east end line of the Elm Orlu.

Q. In your judgment, does it extend continuously thence downward as shown on the model to a point beneath the surface of the Black Rock claim?

Mr. Dickson: We do not dispute that from where it is
803 shown in this red it extends on downwards.

A. That is my judgment. I have not seen it below the 1000 but we have connected it on strike in both directions and I have no doubt it unites on dip.

Mr. Dickson: We don't dispute it.

Mr. Gray: One other question before we leave the Black Rock and Clark tunnels. The Jersey Blue vein is developed in both tunnels, is it, both the Black Rock and the Clark tunnels?

A. It is.

Q. Is there any connection made between the Clark tunnel and the Black Rock tunnel in the Jersey Blue?

A. There is no connection and the reason is that these drifts have been very near the surface and under the engine foundation.

Q. That is just between the two places where it is developed?

A. It is developed in a drift upon the Black Rock tunnel level south of the Rainbow vein in which survey stations 1053 and 1073 are found and in the Clark tunnel passing through survey station 1058.

Q. You have spoken of the Pyle strand. Are there any other offshoots or strands of the Rainbow along the developed area here that you have not yet referred to, of great or small consequence?

A. There is a portion of the Rainbow mineralization extending to the northwest lying on the north side of the Rainbow. It is irregular in its boundaries, in its dip, in its strike and in its
804 mineral composition and extends to the northwesterly for two or three hundred feet until it is intersected by the Jersey Blue vein.

Q. Let me direct your attention to this portion of what you call the Rainbow——

A. Will you permit me to answer more fully that other question?

Q. Yes.

A. In the discovery tunnel we also found a north branch of the Rainbow vein. I have already referred to it, but in answer to your previous question I should have included it.

Q. Indicate it here?

A. It is shown upon plaintiff's exhibit 6 lying north from the strand upon which the discovery was made.

Q. On the Elm Orlu claim?

A. The Elm Orlu claim.

Q. From all of your investigation and examination, from your study of this ground, your acquaintance with the geological condi-

tions therein found, will you state where, in your judgment, the apex of the ore bodies which are developed in the Elm Orlu stope is and also in that connection the apex of this ore body in red which is shown beneath the surface both of the Admiral Dewey and the Jersey Blue and also that portion in red which is shown beneath the surface of the Black Rock?

A. From the developments in the ground by which it is possible to trace continuously that vein—one and the same vein—from
805 the 500 foot level of the Elm Orlu down to the stopes beneath the Black Rock claim colored in red upon the model, and the extension westward of a similar lode of the same vein beneath the surface of the Admiral Dewey and Jersey Blue, I am convinced that the apex or top of that vein is beneath the surface of the Elm Orlu. Some of the stopes in blue upon the model are upon a different vein.

Q. Mr. Winchell, in your judgment—I don't know whether there is any dispute about this or not—from the point where the Rainbow vein has been worked above the 500 foot level up to where it was worked from the discovery tunnel down to the 300 foot level, in your judgment, from your acquaintance with the conditions there, do you believe it to be the same vein which was discovered?

Mr. Dickson: We do not dispute, Mr. Gray, that the vein called the Rainbow lode by our friends upon the other side and as shown upon exhibit 4, continues without interruption in its downward course to the deepest workings.

The Court: Does that involve the statement that it continues down into the Black Rock?

Mr. Dickson: Our claim will be, instead of these two veins, the Jersey Blue and Rainbow as designated by our friends upon the other side, intersecting in the downward course, it is plain where they unite and go down as one.

The Court: I wanted your admission straight.

806 Mr. Dickson: We admit that there is continuity of ore in what they call the Rainbow lode from the surface down to the deepest workings.

Mr. Gray: Mr. Winchell, have you determined the point on the south side line of the Black Rock where this main strand, northerly strand of the Rainbow lode crosses that line with reference to the southwest corner of the Black Rock claim?

A. I have done so, and I find the point to be 310 feet, measured along the south line of the Black Rock claim, easterly from the southwest corner thereof.

The Court: Where is that, to the foot of the Rainbow?

A. That is the eastern margin or southeastern margin of the altered and softened granite shown in that trench.

The Court: One question I want to ask you while you are there. Coming back to this raise upon the Pyle strand, I will ask you if you have data enough to enable you to form a reasonable judgment as to whether the Pyle strand ever existed beyond that slip against which you say it terminates?

A. In the raise?

Q. Yes.

A. The Pyle vein there is so small I believe that that fissure may possibly exist above it, yes, but I cannot find it in the workings above it, and if it were above it would be offset slightly to the south
807 and continue on upward in that position. The fault is not one of apparent great displacement.

Q. Well, is it a fault subsequent to the creation of the Pyle fissure, do you think?

A. I do. That would make the top or apex upon the surface somewhere south of that red line BC in the line drawn upon plaintiff's exhibit 4.

Mr. Gray: If it does exist there, Mr. Winchell, do you believe it is possible—it is possible of identification from the work that has been done?

A. I cannot find it. It might be possible to identify it but I would not know how to go about it.

Q. You spoke very recently here of a granite which had been so altered, I believe, which you measured along the south line of the Black Rock claim. Do you believe the granite up to that point to be a part of the vein, the altered granite?

A. I think so. There isn't any sharp boundary. It is a fading off, as we customarily find upon the borders of the Rainbow vein of the mineralization, the softening and altering of the granite, where the granite has not been completely silicified or mineralized.

Cross-examination.

By Mr. Dickson:

Q. Little fault slips are encountered in the underground workings of the Rainbow at various points that cannot be identified from level to level or traced and identified for any considerable distance in any direction; isn't that true?

808 A. A great many.

Q. Now, the fault which you spoke of and which Mr. Searls referred to as the slip at the Pyle raise, have you ever been able to identify that slip with any other fault or slip in the mine?

A. Yes. I think that is the same slip that is followed in drift 506 to the west of it.

Q. You think there is no question about that?

A. No.

Q. But, apart from where you have it disclosed in that raise, in the drift therefrom, you have not been able to identify it with any fault or slip which you have found in the mine anywhere?

A. I haven't recognized it any other place.

Q. What is the dip of the slip, the direction and degree of the dip of that slip as disclosed in the part of the raise near the top, and uncolored?

A. As disclosed in the raise the dip was 57 degrees to the south. In the drift westerly I have noted a dip of 55 degrees; practically the same.

Q. Did I understand you to say that you thought the Pyle branch

of the vein was disclosed in the drift running from this drift westerly?

A. No, sir.

Q. Where was it you spoke of some drift where you thought it was disclosed?

A. This one.

Q. Oh; running easterly from the raise?

A. Yes.

809 Q. At the 451 level?

A. Yes, sir.

Q. How thick is that slip right there?

A. It is small; six inches.

Q. As much as that?

A. Yes, and in the raise it is a little thicker.

Q. How thick?

A. From six to ten inches.

Q. Not knowing whether that slip has faulted the vein that you have been following up in the Pyle raise or whether it was terminated against that as a sub-fault apex, and having but that one exposure of that fault slip, that being the only place where you can identify it, are you able to say with any degree of assurance, if it were faulted, what the direction of the fault would be?

A. Yes, with considerable assurance, because reverse faults are not common in this camp.

Q. That would be the only reason?

A. Well, that would be the reason for the assurance.

Q. That is the only reason you have?

A. As to the direction of the movement?

Q. Yes?

A. Well, that is all, yes, sir.

Q. Reverse faults are unusual, you say in this camp?

A. Yes.

Q. Are there reverse faults found in this camp especially from some of these little minor faults?

810 A. It is not always possible to determine of the minor faults whether the movement is reversed or not; there must be something to correlate.

Q. This is a minor fault in this raise, isn't it?

A. Yes.

Q. Then are you able to say that that fault was a normal as distinguished from a reverse fault?

A. Not positively.

Q. It is largely, of necessity, is it not, from the slight exposure there, a matter of speculation?

A. From the exposure it would be impossible to tell, but from general experience I have considerable assurance that it is normal.

Q. I understand you to say that in these minor faults, of which this is one, that it is difficult to determine whether the fault is normal or reversed?

A. Quite true.

Q. Now, that being so, isn't it a matter of speculation, Mr. Win-

chell, largely, as to whether this vein in the raise was faulted, and what the direction of the faulting was?

A. I do not attempt to assert it as a fact, but I have given my best opinion in regard to it.

Q. Have you given all the reasons that occur to you for that conjecture in that regard?

A. I have not seen it elsewhere, and I have not seen it faulted anywhere that I can correlate.

Q. Have you given all your reasons for your opinion or conjecture in that regard?

811 A. I think so.

Q. I wish you would take down the 1400 and 1500 levels of the Elm Orlu.

A. Plaintiff's Exhibit 22 is the 1400 Elm Orlu.

Q. Calling your attention, Mr. Winchell, to Plaintiff's Exhibit 22, the 1400 Elm Orlu and the 1500 Black Rock and to the crosscut running in a northeasterly direction from what is designated as the Elm Orlu shaft to and across the westerly end line of the Black Rock claim, starting at transit point No. 10, and following that crosscut thence southwesterly to the Elm Orlu shaft, will you give me your notes as to what veins are there encountered, how many, their dimensions, course, dip, etcetera?

A. I find vein material of the Rainbow vein extending along this crosscut in a southwesterly direction from the survey station which in my book is marked 3, but which corresponds in position very closely with survey station No. 10 on the map, about 40 feet. I then have 27 feet of granite; then comes 10 feet of vein material dipping north 73 degrees, striking north 22 degrees west, with silica and manganese in the granite, manganese in rather fresh granite.

Q. What was the thickness of that vein?

A. 10 feet. Then comes 24 feet of granite containing a few disseminated specks of manganese; then a clay slip, vertical, striking north 34 degrees west, two inches in thickness; then I find 17 feet of granite, and come to a vein four feet in width, striking north

812 32 degrees west and dipping south 73 degrees. Then comes 17 feet of granite and a small slip, vertical striking north 32 degrees west, south of which there is 12 inches of pure manganese and quartz dipping south 85 degrees. Then I find 82 feet of granite—I will change that and add some more to it—99 feet of granite, and a quartz seam six to eight inches, striking north 10 degrees west and 12 inches thick on the east side, dipping south 80 degrees. Then I have fifteen feet of granite, and then six to twelve inches of quartz, manganese and zinc striking north 44 degrees west and dipping south 75 degrees. Then I have 35 feet of altered granite, then crushed granite for 10 feet, striking north 70 degrees west and dipping north 52 degrees. Then comes 26 feet of granite; then comes six inches of quartz dipping south 75 degrees on the west side and 70 degrees on the east side of the crosscut, the strike is not given, but it is platted about north 80 degrees west. Then comes 11 or 12 feet of granite, and a wall with some gouge striking north 84 de-

grees west and dipping south 70 degrees. South of this is a vein which measures 15 or 16 feet along the crosscut.

Q. How wide was the vein immediately preceding that that you referred to?

A. Six inches. Then comes a vein 16 or 17 feet wide in the crosscut, which cuts it diagonally.

Q. Describe that vein generally with its contents?

A. It contains there four to six feet of quartz; the north
813 wall dips south 70 degrees and the south wall dips south 88 degrees. The strike of the north wall is north 84 west and the strike of the south wall is north 85 west.

Q. That is about how far out from the Elm Orlu shaft?

A. 165 feet. Then southwesterly from the vein last described——

Q. Will you be good enough to indicate that on this map; is that what you refer to as the copper vein?

A. Yes, sir, it is.

Q. Well, then you need not bother about it.

A. Then we have 9 feet of granite and 24 to 30 inches of quartz and zinc, vertical, striking about north 84 west; then comes 54 feet of aplite, and then a tight vertical quartz and zinc stringer, striking about north 45 to 50 degrees west; the strike is not given here, only the thickness. Then I have six feet of aplite, and a small stringer of quartz one to three inches, dipping south 65 degrees and striking about north 68 degrees west. Then comes granite for 39 or 40 feet, and we find a vein four feet wide dipping south 88 degrees, striking north 50 degrees west. This has a little internal movement. Then comes the station, and near the shaft on the north side is a slip dipping north 85 degrees.

Q. In that crosscut at a point 8 feet southwesterly of transit
814 point No. 10, I will ask you if there is not found a vein 5 feet in thickness, practically filled with zinc ore?

A. I have described a vein at that point, striking N. 22° W., dipping N. 73°, and described it as a vein. As to how much zinc was in it I do not recall.

Q. Is there any gouge on it?

A. I have none noted.

Q. Have you any recollection of it?

A. No, sir.

Q. Indicate on Exhibit 22 where the point would be vertically below 80 feet southwesterly from Station 10?

A. Along the crosscut?

Q. Yes.

A. It would be here.

Q. Now, take the 1700 Elm Orlu, Exhibit 26, and indicate where that point would come there?

A. About there; I have indicated by a cross in a circle, marked "W" which is near the margin of the 1700 crosscut and near the southeast corner of the Jersey Blue claim.

Q. In your notes do you refer to a vein in that immediate vicinity?

A. No, sir.

Q. You have no mention in your notes of any vein in that locality?

A. I not only have none, but I saw solid granite there.

Q. How far from the point you have designated on Ex-
815 hibit 26 southwesterly on this exhibit is shown and claimed to be the Jersey Blue vein?

A. 68 feet.

Q. I suppose your notes of your observation in that crosscut corresponding with the crosscut on the 1500 foot level would be substantially the same as your observations of the 1400?

A. Why, I think so, if I know what you refer to. I can give them to you in detail if you want them.

Q. I don't want it in detail if you can say that they are about the same.

A. Well, I don't know that I can correlate those veins with each other, but the notes are made in the same detail and I can give them to you.

Q. Perhaps you had better.

A. Starting at the point where the boundary of the Elm Orlu intersects the end line crosscut, and that is right in the crosscut, it is vein material for 7 feet southwesterly from the point in the crosscut which marks the intersection of the northwest corner of the jog in the Elm Orlu with the crosscut. There I find 65 feet of granite, and then a vein dipping north 85 degrees.

Q. Give the dimensions and the strike?

A. Its strike is north 50 west; it contains 5 feet of zinc sulphide, zinc blende.

Q. Any gouge?

A. Two gouges, one of which faults the vein visibly within the width of the crosscut, and another on the south wall. Then
816 six feet of granite and another slip running S. 35° E., dip not given; then 10 feet of granite and a small vertical stringer of quartz striking north 35 to 40 west. Then 7 feet of granite and another small stringer of quartz; then 27 feet of granite and 12 feet of aplite, making 39 feet, to 12 or 14 inches of quartz and zinc, striking north 35 west, dipping vertically; then 24 feet of granite, 6 to 10 inches of quartz dipping south 80 degrees striking northwesterly; then 10 feet of granite and you come to the copper vein which is 12 or 13 feet in thickness; southwesterly from the copper vein is 33 feet of granite, and we find a vein 5 feet in thickness carrying quartz and striking north 35 west and dipping at a steep angle to the south; then 65 feet of granite, where we find 4 to 6 inches of quartz dipping north 85 degrees and striking about north 40 west. Then 26 feet of granite to where there is a 4-inch slip with gouge on it, dipping south 80 degrees. Then 40 feet of granite and 12 inches of quartz and manganese striking north 60 west and standing vertical; then a mixture of aplite and granite to the shaft, and just north of the shaft another little slip.

Q. What is the course of the copper vein; does it belong to the northwest series?

A. Yes, it does.

Q. To what height toward the surface has it been mined?
817 A. Not very far in this ground; up to the 1000 and above.
Q. What is shown in blue on the model on the west end is intended to show stopes on the copper vein, isn't it?
A. Yes.
Q. And they have it colored in blue up to the 900 level on this model?
A. That is true.
Q. That means that it has been mined up that far, doesn't it?
A. Well, it shows in that drift and lateral on the 900; it has been mined above the 1100.
Q. When you say mined you mean stoped?
A. Yes, that is what I mean.
Q. It has been cut on the 900 and shows copper ore?
A. Yes.
Q. It has been cut in the southeast drift on the 800 and shows copper ore?
A. Yes.
Q. And cut in the 700 on the southeast drift?
A. Yes, I think it carries ore into the stopes on the Black Rock vein on that level.
Mr. Gray: Rainbow vein?
A. I mean the Rainbow vein.
Mr. Dickson: Is copper generally found in the northwest-southeast system of veins?
A. South of this portion of the district it is.
818 Q. Well, right in this portion which we have just referred to as a copper vein, that one belongs to the northwest-southeast system and carries copper?
A. Yes, contains copper ore here and may contain it on to the northwest. It has not been developed.
Q. Have you any veins within the region displayed upon exhibit 4, any other northwest-southeast veins that carry copper or that may be mined upon at all, no matter what their contents may be?
A. No, not shown on exhibit 4—I don't know what may be. I think every one of these northwest-southeast fault veins south of the Rainbow vein may be mined on for copper ore.
Q. South of the Rainbow vein?
A. Yes, sir, and north.
Q. And north also, and east?
A. You asked me if it might be.
Q. And east?
A. I don't know anything about that.
Q. Is copper, the copper metal, usually found in the northwest-southeast vein system or system of veins?
A. In the center and southerly portions of the district it is; it is not in the northwest and northern portions of the section.
Q. What portion of the district do we find the Elm Orlu and Black Rock claims in?
A. In the northern portion. And there are many north-

819 west-southeast fissures which do not at the present time contain copper.

Q. There are a great many that have not been developed up to this time; isn't that true?

A. That is what I say.

Q. So you don't know what they carry?

A. No, but I know as far as developed they do not carry copper ore north and west and beyond the Rainbow vein.

Q. Within the limits of the territory displayed upon exhibit 4, what north and west and southeast veins have been developed, if any, apart from what you call the Jersey Blue?

A. There has been very little development.

Q. None except the copper vein which is shown at the southeasterly portion of the Elm Orlu?

A. Yes, I think that is true.

Q. So that in this immediate region, the territory covered by this map, we have only two, according to your understanding, northwest-southeast fissures, one of which you designate as the Jersey Blue, which does not carry copper, and the other which you refer to as a copper vein which does carry copper?

A. That is true as far as developed. From there to the west a short distance there are veins which we identify——

Q. To the westerly?

A. Yes, slightly to the west, in the Poser——

820 Q. We have got territory enough here to cover without going over to the other.

A. Yes, sir.

Q. Mr. Winchell, to save time I do not want to take you over the same ground on cross examination that I did Mr. Greene, as to some certain matters——

The Court: Well, I want to say, Judge, as far as it is material and necessary we will take the time; we don't want you to feel that you haven't got all the time necessary for your cross examination.

Mr. Dickson: I don't desire to take any time unnecessarily. Whether it is necessary to cross examine him will depend upon his answer to this question—I cross examined Mr. Greene and Mr. Searls as to the points where they claimed they had the clearest evidence of a faulting of the Rainbow lode by the Jersey Blue lode. I will ask you, Mr. Winchell, if in your testimony on direct whether the place that you referred to specifically as to where you found the Rainbow lode to be faulted by the Jersey Blue lode embraced any other points than those to which Mr. Searls and Professor Irving and Mr. Greene referred to? I don't think they did.

A. I think the only place to which I called particular attention was not a place where the actual faulting could be seen, that is the 1416 crosscut. I think I didn't mention any place not mentioned by one or other of those witnesses.

Q. Now, you spoke of one place in crosscut 1416 where
821 the Jersey Blue passed through the Rainbow on its dip. Will you refer me to that please?

(Witness indicates.)

Q. Where are you pointing?

A. I am pointing to crosscut marked on the plat 1416, upon plaintiff's exhibit 24, 29 feet south of the sill, upon the Rainbow vein.

Q. Is that crosscut in the Rainbow vein?

A. No, sir, it leaves the Rainbow—it is in the horse in the Rainbow vein—it leaves the Rainbow vein.

Q. Where do you find the faulting there, faulting of the Rainbow lode by the Jersey Blue?

A. That cannot be seen in this crosscut. The Jersey Blue vein itself, after passing through the main strand of the Rainbow vein on its dip to the south can be seen at this point. The Jersey Blue vein can be seen crossing and cutting the Rainbow vein in the end of the small little stope as shown southwesterly from station 247.

Q. Now, one general question and the answer to it may be all that I want on this map. Is there any place on exhibit 24 where you claim to have discovered the Rainbow lode to be faulted by the Jersey Blue vein?

A. I think it is faulted, yes.

Q. Where?

A. Where the Jersey Blue follows along the face of the stope and——

822 Q. The southerly end?

A. The southerly end of the stope and in the westerly end. The point I have particularly observed right now is just south of station 247.

Q. And what are the evidences of faulting at that point?

A. The crushed quartz, clay, dragged into the Jersey Blue vein at that point.

Q. Is that observable?

A. Yes.

Q. What is the course and dip of what you claim to be the Jersey Blue vein as it crosses crosscut 1416 on exhibit 24?

A. The strike of the north or footwall is north eighty degrees west; the dip south 80°.

Q. That is the Jersey Blue you refer to?

A. Yes. The strike of the hanging wall upon the east is north 86° west. There is six inches of gouge upon the hanging wall; the dip is vertical and there is much crushed quartz and granite and some zinc and manganese in the vein which is there thirteen feet wide.

Q. What are the evidences of that—give us the notes of your observations—where the Jersey Blue lies within the Rainbow?

A. The Jersey Blue vein with its walls and banded structure with nearly vertical dip, cuts across the Rainbow lode, which has a structure dipping flatly 53° to the north, and it is not so well

823 banded, the Jersey Blue shows one foot to three feet of gouge and crushed quartz, manganese and granite and so forth on the north wall, then five feet to six feet of zinc ore, then a hanging

wall slip with one inch of crushed quartz striking south 51° east, the whole cutting the Rainbow closely and is here within it.

Q. What is the thickness of what you regard as the Jersey Blue vein there?

A. There?

Q. Yes, the entire thickness?

A. About eight feet.

Q. Was that work done by the Elm Orlu company?

A. The crosscut was done by the Elm Orlu. There has been [illegible] work done by the Black Rock people.

Q. I wish to refer to where you have the Jersey Blue vein lying within the boundaries of the Rainbow vein. Was that work done by the Elm Orlu or who?

A. This is no working; nothing but a crosscut there.

Q. Only disclosed in the crosscut?

A. Yes, sir.

Q. Take the Black Rock 800 level for a minute. Calling your attention to plaintiff's exhibit 8, being the tunnels map, I don't quite understand your explanation of where it was there on that level the Jersey Blue vein appears to have been faulted by the Rainbow? Will you just give me that again?

A. Yes. Because the Black Rock fault faults the Jersey Blue and instead of being faulted by the Jersey Blue vein it is actually faulted by the Black Rock fault, but the Black Rock fault there includes a portion of the Rainbow and all there is of it there.

Q. Before the Jersey Blue however was faulted by the Black Rock fault it must have been—have extended through the Rainbow lode, of course?

A. Yes.

Q. The faulting didn't throw it entirely out of the Rainbow lode; it left a portion of it in the Rainbow lode still?

A. Quite true.

Q. And do you find that portion of what you call the Jersey Blue between the faulted segments of the Jersey Blue and the Rainbow vein?

A. The map, plaintiff's exhibit 8, is not quite accurately drawn. We never know where the faulted segment of the Jersey Blue might be found.

Q. Might be found?

A. Yes. It is not disclosed.

Q. It has not been found?

A. No, sir.

Q. There is, however, a working running across the Rainbow vein from station 1057 to 1072?

A. Yes, sir.

Q. Where, on its westerly edge of that working, you show clear to the point where you have put in pencil, the place indicating where the Jersey Blue vein should be found in the Rainbow?

A. No, I haven't shown. I didn't put those pencil marks on there.

Q. You didn't?

A. No, sir. I can represent my own idea on that.

Q. Will you do so, please; use some other color so we will be able to distinguish it, where you think the Jersey Blue might be found crossing the Rainbow?

The Court: Are you erasing the map?

A. Not an essential part of it. I think that the actual plane of movement of the Black Rock fault on the south side of the Rainbow vein at that point is where I have drawn the black pencil mark which I will mark "S" and south of that, in granite. It will be necessary to take off that——

Q. Where, westerly of that or northwesterly or where you think the south branch of the Black Rock fault should be shown upon this exhibit, do you think the segment of the Jersey Blue vein, which crosses the Rainbow, would be found?

A. I don't know exactly, but I say there is possibly a segment lying in there and it is a matter which I could not possibly attempt to predict exactly, where.

Q. You suppose or do you not, if it were found it would show that it had faulted the Rainbow lode there would be evidence of its having faulted it?

A. I explained this morning by a sample which I introduced here that you cannot always trace—sample W-3—those fis-
921 sures through the quartz. It might quite easily be that there was a certain amount of re-cementing after the brecciation and faulting, in connection with solutions which came along the Black Rock fault. I am not at all certain that it would be found there.

Q. It might be or might not be?

A. Quite true.

Q. If it did cross and fault the Rainbow lode it might show unmistakable evidences of that fact?

A. It might and might not.

Q. And it would require but a few hours' work to drive a drift across there which would disclose the Jersey Blue in the Rainbow and disprove, perhaps, that it had faulted it?

A. Do you want to know why we didn't do it?

Q. No, I say a few hours' work would have illustrated whether it in fact crossed the line or had or had not faulted it?

A. It would not show it as a demonstration or as a fact because it might not be visible.

Q. Well, it might however——

A. Whom you have——

Q. Wait a minute. A few hours' work might have disclosed the fact that the Jersey Blue vein was there and found within or crossing the Rainbow lode?

A. That would be a very nice development; if I had thought of it I would have had it done.

Q. I say it would only take a few hours' work?

827 A. Yes, if I had thought of it I would have had it done.

Q. And it would show that the Jersey Blue not only crossed the Rainbow, but it might have shown evidences that it faulted the Rainbow?

A. That is shown in so many other places that it was not considered important.

Q. Yet you say if you had thought of it you would have had it done?

A. Yes, any place where it could be done so easily I would have had it done.

Q. Directing your attention to the model, plaintiff's exhibit 46 and to the raise in red running up from the 1500 foot level of the Elm Orlu to the 1410 level—or so marked on this model—and thence on upward to the connection with—what level is that?

A. The 1200 Black Rock.

Q. On this raise from the 1500 Elm Orlu to the 1200 of the Black Rock is the vein unmistakably in ore?

A. It is.

Q. And in the Rainbow lode?

A. I think so. The Rainbow lode is very wide down there.

Q. Calling your attention, a moment, Mr. Winchell, to Plaintiff's Exhibit No. 15, I point to crosscut 825 which was work that you directed to be done in the search for the Pyle branch in a northerly direction, which did not pursue the course which it should have pursued, and that you intended it should have pursued?

828 A. It did not pursue the course that was directed.

Q. It should have run more directly north?

A. The map which I had at the time showed the crosscut further east, showing the drift running almost east, and showed the position of the east end of the drift on the east end line near the northeast corner of the Elm Orlu. I directed a crosscut to be run along the line.

Q. Well, it is very near the line?

A. Well, it was not within fifty feet of where I supposed the crosscut would be.

Q. How many feet was it from the line where it was started?

A. About 20 feet.

Q. And your desire was to have that crosscut run northerly in the direction of the east end line of the Elm Orlu?

A. Yes, sir.

Q. You wanted that crosscut driven, expecting or believing or hoping that, if driven far enough, it would cut the main branch of the Pyle branch or strand, did you not; that was the purpose?

A. That was the purpose.

Q. And that crosscut and all work on it was stopped over a year ago, wasn't it?

A. I think so.

829 Q. You have been here many times since it was stopped?

A. Yes.

Q. And you observed it not having been driven in the direction you wanted it?

A. Yes.

Q. And it was 20 feet away from the east end line of the Elm Orlu?

A. Yes.

Q. And how far did you think it would have to be driven to encounter the easterly extension of the main branch of the Pyle strand?

A. Altogether too far on that line on which they ran the crosscut. I intended to run a new drift, following the main branch, and it is not my fault that it was not run.

Q. How far would they have had to run that crosscut, starting, following the direction of the east end line of the Elm Orlu, about how many hundred feet would it have to be driven?

A. I don't know; it depends upon the strike of the main portion of the Pyle branch there.

Q. Well, about how much?

A. About fifty or sixty feet. We made many requests to have work done here and it was not done.

Q. Did you make any request whatever after the first one respecting this crosscut 825?

A. Yes, sir.

Q. And repeated requests?

830 A. Yes, sir.

Q. Of whom?

A. I spoke to Mr. McLeod repeatedly, and communications have been sent in writing that the work has been delayed constantly, and we were not able to have it done.

Q. Did you make complaint to any of the attorneys for the Butte-Superior, or any request to have work done?

A. I think we have requests in writing to expedite work repeatedly. It could not be done until the raise was through. This part was more important than the other, and the other was not finished, therefore this was not done.

Q. When did you request to have that crosscut run 50 or 60 feet?

A. I never requested that. As soon as I found the survey was wrong, I abandoned that crosscut, but I did ask that this work be expedited so that I might extend that drift out easterly.

Q. Now, while we are on the Pyle branch, we will go to the model. How far above the 451 level do you say the vein continued upward in the raise?

A. 12 sets.

Q. What is the height of each set?

A. It was in the 12th floor. The sets are, I suppose, eight feet.

Q. That would be in round numbers 100 feet?

A. Something less than 95.

831 Q. This model is on a scale of 40 feet to the inch?

A. Yes.

Q. Instead of the ore being represented in that raise as 100 feet above the 451 level, how many feet in fact is it represented to be?

A. 60 feet. I counted the floors, I remember, and there was not

any careful measurement made, but in the 12th floor, according to my notes, the vein is found.

Q. I am not making any criticism of it.

A. Well, I am just explaining it.

Q. Tell me again what was the dip of that slip there?

A. 57 degrees to the south.

Q. Should it not have been encountered in this 451 crosscut to the south from that raise if it continued on its downward course of 57 degrees to the south?

A. It should, yes.

Q. About how far southerly from where the raise starts upward from that level should it have been encountered?

A. Well, I don't know exactly.

Q. Well, approximately?

A. I should say somewhere around 100 or 120 feet.

Q. And the crosscut extends how far northerly?

A. Oh, much further; about 210 feet.

Q. Did you ever observe that slip in that crosscut?

A. Not to identify it. I have a matter of 20 or 30 slips in
832 that crosscut—well, I would not say that many; I will count them. I have 17 slips shown in that crosscut.

Q. You did not find any that you have been able to correlate with the one in the raise?

A. No, I did not attempt correlation.

Q. I think you stated in direct examination that the vein, the Pyle branch of the vein at the 1000 foot level was 10 or 12 feet thick?

A. Yes, I think it is thicker than that.

Q. How thick is it?

A. I have a pencil mark here which says 13 feet. I think I read it 18 feet before.

Q. At the 700 foot level how thick was it?

A. 5 feet.

Q. And at the top, where you observed the ore—Mr. Searls said four feet; what is your observation?

A. I think it was two or three feet according to my recollection; I haven't got a note of it.

Q. How thick is that branch in the westerly end—where the raise goes up from the westerly end of drift 1106, a drift running westerly from the bottom of the Pyle raise; about 4 feet, did you say?

A. Oh, it is 8 feet there.

Q. In that raise I am pointing to?

A. Yes, at the foot of that raise it is 8 feet, and I have not got the thickness shown in the raise.

Q. Have you got the vein at the top of the raise?

A. We have.

Q. How thick is it there?

833 A. I don't know.

Q. You have no recollection of it?

A. No; I was not there when it showed the full width, but in the drift which is connecting with it there is five or six feet of vein

and running northerly from it are a great many stringers running over to connect with the north branch, so it is quite wide.

Q. The drift you refer to is 1232, which as far as the model shows has not quite connected with Raise 1106?

A. Yes. I suppose that is connected today, but the model does not show it.

Q. The last time you saw the easterly face of 1232, the vein was about 5 feet six?

A. Five or six feet, yes; that was last night.

Q. Take down the tunnel map, Exhibit 8. From the Clark tunnel there is shown upon this exhibit at station 834 a drift extending westerly from the Clark crosscut or tunnel?

A. Yes.

Q. And what is that blue color there in that working intended to represent?

A. That represents a small vein with some gouge along it.

Q. About how wide, how thick?

A. It shows in the side of the drift, and the thickness——

Q. The drift is represented here as showing its entire width. What is the width?

834 A. In the crosscut there was six to seven feet of oxidized vein material in gouge. In the western face there was some black manganese and quartz and some crushed material, very much oxidized altered granite.

Q. And the blue streak represents that?

A. In the vein.

Q. Vein material?

A. Oh, yes, those blue streaks represent vein material, but they are sometimes very small.

Q. What was the dip of that vein there?

A. 75 degrees to the south about.

Q. And the other blue streak crossing that tunnel at station 1058, how does that stand?

A. That stands vertical and strikes north 63 west, has 8 inches of quartz and 18 inches of gouge and crushed granite.

Q. Do you know how or by whom the discovery shaft upon Exhibit 4 was located?

A. From the patent notes.

Q. It is represented on Exhibit 4 as being located on this Black Rock fault?

A. Yes.

Q. Between what you claim to be the north branch and the south branch of the Rainbow lode?

A. Yes, and very closely to the south branch.

Q. All you know about that is, that that is where the patent calls have it, as you understand it?

A. Yes, as I understand it.

835 Q. And what do you know about the discovery shaft of the Black Rock of your own knowledge?

A. I don't know what is the discovery shaft.

Q. How far south of what is marked discovery of the Black Rock

on Exhibit 4 is the north edge of the south branch of the Rainbow lode; practically on it, isn't it?

A. Practically on it.

Q. And immediately extending easterly therefrom, are old stopes?

A. That is true. I have already described them as extending substantially eastward from the point of discovery.

Q. You recognize in many instances, as I understand you, altered granite as part of the vein?

A. It is often part of the vein.

Q. And especially in close proximity or in actual contact with a vein, large or small, if you find the granite altered along the plane of contact, you would think that that alteration was due to vein action, and would call it vein material, would you not?

A. Yes, I would, but I would not call the vein continuous when it is faulted there.

Q. Well, don't answer anything except my question, if you please.

A. I beg your pardon.

Q. Do you not find crossing in the immediate vicinity of the east end line of the Black Rock seams of vein material crossing the east end line?

836 A. Yes, sir.

Q. And altered granite between them?

A. More or less; some rather fresh granite, some considerably altered.

Q. Between the seams of vein material?

A. Yes, striking in a northwesterly direction.

Q. But crossing the east end line of the Black Rock?

A. Yes, but not striking toward the discovery shaft.

Q. But crossing the east end line of the Black Rock?

A. Yes, indeed; yes.

Q. Assuming, Mr. Winchell, that your conjecture that that slip in the Pyle raise, if it faulted the Pyle branch of the vein, that the vein would be thrown to the south, is justified, I will ask you if you started any work or directed any work to be driven southerly from that raise from the top of that raise or anywhere, to find that faulted segment in its upward course?

A. No, I did not. The vein was very small, and we had a crosscut above, and one below.

Q. You of course cannot be certain that it did not extend further upward, if it is there faulted?

A. No, I cannot be.

Q. And you said if there was any fault on that slip it would be very slight in your opinion, so it would only have been necessary to have driven out from the top of that raise a very short distance to prove the fact, isn't that so?

837 A. Yes, but that was another of those workings where it was very difficult to work; it was a place where it was difficult to prosecute work.

Q. Did you request to have that done?

A. No.

Q. How do you distinguish, or how does any geologist distinguish between a post-mineral and pre-mineral fault, where the post-mineral fault is a strike fault, striking through or on either wall of the vein?

A. Post mineral faults or gouges will not disclose the evidence of replacement by the mineralization.

Q. Yes, that would be one good way to identify it.

A. That is the principal criterion.

Q. Any others?

A. Well, that is sufficient.

Q. Well, suppose it is the only one really. You spoke of the Jersey Blue vein being very wet as compared with the Rainbow?

A. Yes.

Q. That would not throw any light on the question as to which of the two was the older, I take it, that fact alone?

A. Why, yes; not that alone, but in connection with all the other information that we have as to the characteristics of other veins, that has a very decided bearing.

Q. If you have two veins, and one is wet and one is dry, and they are two or three or four or five or six hundred feet apart, the
838 one that is wet with water in it will be accounted for the character of the country through which it goes, whether it was older than the drier one or younger, wouldn't it?

A. Oh, to a certain extent, that is only a general characteristic. You cannot say positively because a vein is wet that it is a fault vein.

Q. I should not suppose so.

A. No, sir.

Q. Is it anything unusual or improbable or impossible that two veins, two fissures, rather, I don't mean veins, might be opened up by the same dynamic force at the same time and intersect one another without any displacement whatever?

A. There is nothing impossible in that supposition.

Q. Haven't such instances as that come under your own personal observation?

A. Oh, yes, but when we find fissures, one of which has a certain character and the other a different character and where with the wet occurs the mud and the mush and the slop which always is found upon these blue veins, then we are justified in drawing certain conclusions.

Q. Now, that explanation was not at all relevant to my question. The question was whether it was improbable that you could have two intersecting fissures opened at the same time by the same dynamic force without any displacement, and I understand you to say yes, and that such instances had come under your own personal observation?

839 A. Quite true.

Q. That is all the answer that is needed there. The attorneys will argue this case when the evidence is all in. That is all.

Redirect examination.

By Mr. Gray:

Q. On the Black Rock tunnel where it was suggested that some work—where you said you would be glad if some work could have been done for the purpose of exposing if possible the segment of the Jersey Blue between the two strands of the Rainbow. Is it certain at all, Mr. Winchell, that it would be picked up and identified in that area?

A. It would be extremely unlikely that it could be. The ground is extremely crushed; it is very near the surface and much oxidized. The portion of the Rainbow vein which is there is between two strands of the Black Rock fault, and they are both very near the Jersey Blue fault, and it might not be found, but I should have been glad to do the work if I thought it could be found.

Mr. Gray: In this connection, Mr. Dickson, and in connection with the suggestions which have been made, or some point has been made that the work on this East 821 drift and also some other work has not been performed, I would like to offer in evidence the letters to your company of September 1st, 1914, October 5th, 1914,
840 December 15th, 1914, November 16th, 1914, February 5th, 1915, February 17th, 1915, April 9th, 1915, and a reply from Mr. J. L. Bruce, your manager, of November 17th, 1914, copies of all of which you have.

Mr. Dickson: I have never seen them. Upon the crosscut 825 on the 800 foot level he says he never did request to have it driven in any other direction, and the other was the drift easterly on the main branch of the Pyle branch. If the letters have reference to that one place I have no objection.

Mr. Gray: To these places and this 450 right here, where you have spoken of there not having been work done here. The others all relate to the 800 and the work there which for more than a year we have been trying to carry on, and which apparently is only carried about 100 feet west of the Pyle raise.

Mr. Dickson: If my memory serves me, the witness did not speak of any failure on the part of the Butte-Superior to comply with any request to do work there.

Mr. Gray: We are not complaining, but the suggestion was made that we did not develop this part as thoroughly as we might, and I simply introduced these letters to show that we have made many requests for work both east and west of that raise on the Pyle.

Mr. Dickson: I suppose you do not complain that the officers or agents of the Butte & Superior have shown any disposition not to comply with your request?

841 Mr. Gray: No.

Mr. Dickson: Whether they have not been doing work almost constantly for you.

Mr. Gray: They have, and we are not complaining, but the fact is that conditions underground there over which they perhaps had

no control and I think which they could not control, and because of those peculiar conditions in and about that raise and the ground there that it was difficult to handle the rock out of there, it has been very difficult for them to pursue the work as rapidly as we would have liked; but the inference at least comes from the suggestions that you have made that we have been somewhat negligent in requesting that work, and for that reason I offer these letters.

Mr. Dickson: I have not had time to examine the letters.

Mr. Gray: You may have until Monday morning to look them over.

Mr. Kremer: This work you are now speaking of is in Elm Orlu ground?

Mr. Gray: It is work that had to be done from your own workings; the only entrance is through your workings.

Mr. Dickson: That reminds me: you were driving on the 900 were you not, to establish a connection?

A. We were.

Q. With the Pyle branch of the vein?

842 A. Yes, sir.

Q. And wasn't that stopped for over two months this summer?

A. Well, as to that I can't say, but I know we had to run a lateral out there 450 feet in length before we could begin drifting.

Q. That work was under the control of the Elm Orlu people; they didn't have to depend upon the Black Rock people to do that?

A. No, it was not, and they made four or five times the progress that was made in your 800 foot drift.

Q. Answer my question: You did not have to depend upon the Black Rock people to do that?

A. No.

Q. How rapidly it should be driven or whether it should be interrupted or delayed or not was a matter over which the Black Rock or the Butte Superior Company had no control?

A. None whatever.

Q. And wasn't that work this summer stopped for two months?

A. If it was I didn't know it.

Mr. Gray: I offer these in evidence simply for the purpose we mentioned. (Referring to the letters.)

Mr. Dickson: If we have no objection to them we will so state Monday morning, and we may want to offer our replies.

843 Thereupon the exhibits were marked Plaintiff's Exhibits 55 to 60 for identification.

Mr. Folsom: I desire to offer in evidence an exemplified copy of the patent record of the Elm Orlu.

Mr. Dickson: We object to it as incompetent, irrelevant and immaterial, and there is no issue as to the Elm Orlu or their lessor, the Clark-Montana Company, having obtained the patent in this action and the only proposition that would be subserved by the introduc-

tion of the record would be to endeavor thereby to give effect to that patent by relation to a date anterior to its issuance; the same objection I made to the testimony.

The Court: The objection will be formally overruled and exception noted. Of course, whenever the law is finally argued if this is entitled to no consideration the court will give it none.

Whereupon the exemplification of the patent was admitted in evidence and marked Plaintiff's Exhibit 61.

The Court: Do I understand you have used all your witnesses?

Mr. Gray: I understand, your honor, we were limited to five experts.

The Court: Five gentlemen on a side, all eminent in their profession, it seems to me if there is anything of real importance
844 as to the expert side of their case it ought to be sufficient.

Mr. Dickson: I think five is as good as a dozen.

The Court: If the court could not be convinced by one side or the other by five, I don't see how it could be by ten.

Whereupon an adjournment was taken until 10:00 o'clock a. m., Monday, October 25th, 1915.

Monday, October 25, 1915.

Trial resumed pursuant to adjournment.

The Court: Well, gentlemen, I suppose, after a day of rest and religious reflection you are ready to proceed.

Mr. Dickson: If your honor please, our maps and exhibits have been somewhat delayed. They have been working on them until six o'clock this morning, but they were only completed a few minutes ago. I think, however, we will consume the two hours of the morning session on other matters, and we will put them up at noon. I wish to recall Mr. Winchell for a few questions.

Mr. Folsom: Well, there are some formal matters that we had better complete first.

It may be stipulated that the description of the Black Rock and Elm Orlu claims as set forth in the complaint are correct, excepting that in the complaint the north line of the Black Rock claim is described as being 1500 feet in length, whereas it is in fact
845 1507 feet, and is shown correctly upon the plat which is attached to the complaint.

Mr. Kremer: Yes, and I think by a typographical error there is an additional mistake in the second course which reads: Thence south 2 degrees east 392 feet. It is in fact 393 feet.

Mr. Folsom: Yes.

Mr. Kremer: Then, proceeding, from corner No. 2, from which the corner of lot 38 bears south 9 degrees 30 minutes west, a distance of 27 chains and 90 links, the patent says 23 chains and 97 links. Then, following the description the last distance is given as 1507 feet instead of 1500 feet. That is the fact, isn't it?

Mr. Folsom: Yes.

Mr. Dickson: I suggest that the corrections should be made in the complaint.

Mr. Folsom: Very well.

Mr. Kremer: Then also, Mr. Folsom, in the description of that portion of the ground, which, for want of a better name we will call the conflict area, the last distance given in that description is 46 feet more or less. The patent reads 45 feet.

Mr. Folsom: Very well; those corrections may be made in the complaint.

Mr. Kremer: And of course in the description of the Elm Orlu, there is an exception of all that portion of the surface ground, the distances and courses of which, of course will be correctly
846 stated, and I don't think there will be any contention that that is not the mineral rights.

The Court: Well, if there are any amendments to the pleadings stipulated, counsel should see to it that the court direct them to make the amendments and place them correctly in the pleadings.

Mr. Kremer: It is only to save time in making the surveys. There will be no contention about it.

Mr. Scallon: In connection with that matter, if your honor please, the exception from the Jersey Blue, in as much as we are now stipulating as to description, we have got, of course, to be precisely correct. The exception as it reads in the complaint is that the exception is of the surface ground, and as a matter of fact the whole area in conflict is excepted, and that is without prejudice of course to the mining rights belonging to the Elm Orlu, and without prejudice to the mining rights that go with this area, but that might limit the Black Rock rights to the surface if the exception was stated in those words.

Mr. Folsom: If it be understood that there shall be no prejudice resulting from this stipulation. Let the record show that it is stipulated that whatever title McNamee, Burkett and Savage acquired to the Elm Orlu claim by the location, if any, was vested in the patentees at the time of patent. This, of course, is not to be deemed an admission by the defendants that they acquired any title by virtue of their location.

847 The Court: What is that?

Mr. Folsom: That whatever title, if any, was acquired by Burkett, Savage and McNamee to the Elm Orlu by the location was vested in the patentees of the Elm Orlu claim at the time of the issuance of patent, that being for the purpose of avoiding introducing the chain of conveyances; but nothing in the stipulation is deemed to be an admission by the defendants that they acquired any title by virtue of their location. They make some point as to the location.

Mr. Kremer: And the objection may be understood as going to the same on the ground of its competency, having in mind the claim that the location notice is defective, and as to the date of the relationship.

Mr. Folsom: Let the record also show that the title acquired by the patentees to the Elm Orlu claim is now vested in the Clark-

Montana Realty Company, and that the amount in controversy is in excess of three thousand dollars, exclusive of all costs.

Mr. Kremer: We will make the same stipulation as far as our proof is concerned and as far as the Jersey Blue is concerned the same stipulations may be made.

Mr. Folsom: Of course, and as to the Admiral Dewey.

Mr. Kremer: We will admit that regardless of the senior or junior rights, that you would perhaps have the right, if you had
848 any extralateral rights by reason of your geological conditions under the Admiral Dewey—in other words, the Admiral Dewey is not within the controversy.

Mr. Folsom: Well, it might dip below that.

Mr. Kremer: Well, as I say, there will be no contention about your rights as to that. The Admiral Dewey patent is long subsequent to this.

Testimony of Horace V. Winchell, Recalled.

HORACE V. WINCHELL, recalled for further cross examination, testified as follows:

Cross-examination.

By Mr. Dickson:

Q. You have spoken of an east and west system of veins. Does that system embrace more than one vein, or is what you have spoken of as the Rainbow lode or vein the only east and west vein?

A. Do you mean in this particular territory?

Q. Yes, involved in this case, or west of it either?

A. Oh, I think there are quite a number of very small veins.

Q. East and west veins?

A. Why, under the east and west system of this ground.

Q. In this territory, within the limits of the Elm Orlu and Black Rock, does the so-called Rainbow lode, which you say
849 branches in various directions, branch also in its downward course in places?

A. Yes, it does. There are horses in it at all depths with which I am familiar.

Q. Don't you have branches on the strike, branches upward and branches downward?

A. That is true.

Q. As to the extent or magnitude, rather, of faulting of the so-called Rainbow lode as compared with the faulting of what you designate as the Jersey Blue lode, confining your answer to that portion of the Rainbow lode which extends in a northeasterly direction from the west end line of the Elm Orlu, by what veins or fissures is it faulted—the Rainbow—in addition to the Deadwood, Black Rock, and as you claim the Jersey Blue?

A. Yes. There are other faults belonging to the northwest system observable underground and observable from the structure upon the

surface. One of these is indicated in the disconnected blue line running in a northwesterly direction across nearly the middle of the Elm Orlu claim and indicated as displacing somewhat the Rainbow vein.

Q. Any other, apart from the little minor seams that both you and Mr. Searls have referred to as having no very considerable extent in any direction?

A. There are other fractures and faults of that system.

850 Q. I say, apart from these small veins that cannot be identified for any considerable extent in any direction on the different levels, are there any other fissures or veins which fault that portion of the Rainbow which is depicted upon the map, plaintiff's exhibit 4, except the Deadwood, the Black Rock and the one just alluded to near the center of the Elm Orlu shown by the blue line and as you claim the Jersey Blue fault?

A. Yes, within the limits of the map, crossing the vein upon the Poser ground there are at least two or possibly three more, but they are not colored in red on this map.

Q. It is my fault that you answered that way. I intended to call your attention to easterly of the west end of the Elm Orlu.

A. Perhaps you did. I don't recall any important easterly of the west end of the Elm Orlu.

Q. In this Rainbow lode have you found places in its course—different levels where there was a clay gouge or gouge which was referrable to the internal movement in the vein itself?

A. Yes, that is not uncommon. Sometimes these gouges have been silicified, replaced by quartz or manganese. Sometimes they are quite recent, especially in the vicinity of the crossing of the Jersey Blue and the Black Rock.

Q. Well, apart from any faulting by any other vein or fault fissure, as I understand it is not unusual to find clay or gouge

851 within the Rainbow lode which is due to internal movement in that lode or vein itself?

A. That is true. Sometimes the cracks have been opened by the settling of the ground since mining operations began and in those cracks clay or attrition matter may be carried by water and you may have a very recent little gouge there.

Q. Well, have you none except those that are accounted for in that way by mine workings and settling as the result of mine workings—in a great broad vein like this it is not at all unusual, is it, to find clay gouge within the vein due to the internal movement of the vein and not due to mine working?

A. That is true, but such gouges have no continuity or extent; they are local; they run in various directions and they have diverse dips and are easily distinguishable in that way from mine gouges.

Q. Have you undertaken to determine the width of the Rainbow lode that you have spoken of at the point where it crossed the common boundary line between the Black Rock and the Elm Orlu?

A. I should say that the western boundary is not well disclosed immediately at that point of crossing. There may be——

Q. Well, have you made any effort? If you haven't I care nothing about it. Have you made any careful effort to determine when the north wall or north boundary of the Rainbow lode crosses the common line?

A. No, the trench has not been extended in that direction.

Q. When were you first able to get access to the discovery shaft of the Elm Orlu; do you remember about when?

A. No, I don't recollect. We began the work early in 1914, but I should say, and within two or three months we were at the discovery point.

Q. It took some time; the works had to be cleaned out in order to get down vertically beneath the discovery of the Elm Orlu.

A. We ran a new tunnel.

Q. You ran a new tunnel for that?

A. Yes, sir.

Q. Now, immediately beneath the discovery point of the Elm Orlu, have you noted in addition to the Rainbow lode coursing in an easterly and westerly direction, a vein coursing northwesterly and southeasterly in juxtaposition, crossing the vein there?

A. There is such a small vein there, yes.

Mr. Dickson: We are not going to claim, gentlemen, that you did not locate upon an east and west vein or did not locate upon the Elm Orlu vein, but in our answer we set up an information and belief that the discovery was upon a vein that crossed the side lines of the Elm Orlu claim and I just asked this in explanation of that. There are two veins, one having a course that would carry it over the side lines, and the other easterly and westerly.

The Court: Of course the Rainbow would carry it off the side line?

Mr. Dickson: Yes. It crosses an end line rather than a side line.

Q. (Near the intersection, Mr. Winchell, of the Rainbow lode by the Jersey Blue vein in its downward course. I understood you to claim it intersects and crosses and goes on beyond to the south of the Rainbow?

A. Yes, sir.

Q. If you what level does that intersection commence—just say to the nearest a measure if that will aid you any?

A. That depends on the longitude.

Q. What I want—maybe I informed you yesterday in connection with this question as I would save time by it?

A. Yes, sir.

Q. I want you to explain the course, the easterly or westerly limit, the intersection in the upper level and go down, showing when it intersects on each level, and the easterly and westerly limits of intersection, so far as developed, according to your observation?

A. It can be understood from the relation of these two veins as shown upon plaintiff's exhibit 2 as testified regarding their dip that the point of crossing of the Rainbow——

Q. No, that I am not asking about.

A. I will come right to the question. I just wanted to explain—is naturally deeper as you go west. It comes to the surface or close up to the surface a short distance west of the Black Rock shaft and upon the 1500 level the Jersey Blue is crossing the Black Rock or Rainbow vein at the west end line of the Ella Ophir claim. Now, between these two points I will give the places where——

Q. I understand that they would not intersect on a horizontal plane at all?

A. Probably that is very elementary, but I wish to explain it because you asked me at what dip and the dip is at the surface, at the point of intersection, as shown, and at the 1500 foot level on the west end line——

Q. You misapprehend my question. It is the point of intersection and the downward course, not on strike?

A. Every angle intersection below the surface is an intersection on the downward course.

Q. There is a certain area so far as developed where you claim the development on the downward course is easterly, it has passed through and beyond the Jersey Blue line as shown on your 1700 foot level. It is that easterly portion where you claim there is such an intersection that I wish to invite your attention to.

A. I cannot limit it to any easterly section unless you tell me just how far west because every point where the vein begins to pass through an strike it also passes through on dip.

Q. I will confine your attention then to this portion of it which is easterly of where it crosses the common side lines.

A. West of the point of crossing of the apex of the main strand of the Rainbow vein across the south side line of the Black Rock, the Jersey Blue vein enters the Rainbow vein on dip and can be seen within it, first upon the 1500 foot level of the Black Rock claim, where it can be seen in the stope——

Q. I simply want the point and the distance easterly and westerly of that intersection on that level?

A. It can be seen in the stope——

Q. I understand you to so testify.

A. Well, I started to finish it.

Q. I don't want you to go over what you have already testified to. Give me the point, indicate upon this exhibit where you have that intersection on this level westerly and easterly?

A. You asked me west of the point of crossing.

Q. Yes.

A. Well, the point of crossing is about at co-ordinate 600 west, consequently I cannot give you anything east. I have got a dozen points east, but it is west of that point.

Q. Give it in your own way then?

A. At the point 250 feet east of the southwest corner it is seen in the stope, and westerly therefrom for a distance of about 180 feet.

Q. On that level how far easterly?

A. On that level it extends easterly for some 250 feet.

Q. Take the next one.

A. Upon the 1400 foot level of the Black Rock the Jersey Blue vein can be seen passing through the Rainbow vein for a distance of about 300 feet westerly of co-ordinate 600 west, upon this sill floor. Upon the 1500 level of the Elm Orlu in the 1504 drift and in the 1504 raise, at the 4th floor, and just east of this point, very close to it.

Q. Just east of No. 600 co-ordinate?

A. Just east of No. 600 co-ordinate, in 1511 crosscut, upon the sill floor.

Q. As I understand the extent of the intersection on this level, the extent easterly and westerly would be indicated on the exhibit by the blue running through the red?

A. Yes, sir.

Mr. Gray: I think you cut him off before he had finished his answer.

Q. Did you finish your answer?

A. No. It is seen four floors above this sill, above the 1511 crosscut in the stope.

Q. What about the 1600 of the Elm Orlu; have you anything to say about that intersection?

857 A. There is no disclosure of it on the 1600; there is on the 1700.

Q. Yes, I understand. Now, the first level that you have this connection is the 1400 of the Elm Orlu, being the 1300 of the Black Rock, both shown on the same exhibit. Now, above that level shown on this exhibit isn't there an ore connection in unmistakable vein material extending from the Elm Orlu to the Black Rock in this area that we have been talking about?

A. In an easterly and westerly direction along the strike?

Q. Yes?

A. Please read the question.

Q. Well, show me some of the cross sections where that big ore body is.

A. Plaintiff's Exhibit 31.

Q. Calling your attention to cross section, Plaintiff's Exhibit 31, will you indicate to me where the 1100 of the Black Rock would be on that section. This is the 1100 of the Elm Orlu on the map and this is the 1200 of the Black Rock; about where would the 1100 of the Black Rock be if it had been shown on the map?

A. About 100 feet above the 1200 Black Rock.

Q. Now, up as high as the 1100 level of the Black Rock have you not continuous unmistakable vein matter extending where that is colored in red upon this level, representing the ore in the

858 Elm Orlu vein, northerly to the Jersey Blue fissure—I mean at the point where cut by this plane of section, of course?

A. I don't think so.

Redirect examination.

By Mr. Gray:

Q. Mr. Winchell, in the workings to which Judge Dickson has directed your attention on the lower levels, you spoke of seeing the Jersey Blue vein passing through the Rainbow vein at and above the 1400 level and in some workings above it. In that portion of the vein is it passing through the vein or parallel with the vein for a distance?

A. It is passing diagonally across it on strike and dip.

Q. You have been asked concerning the northwest veins in the territory northeasterly from the west end line of the Elm Orlu, and you have referred to the important fault that you have observed there. In addition to those, are there others of less importance, but belonging to that northwest system?

A. There are, and they are shown both in the stopes and upon the sill floors.

Recross-examination.

By Mr. Dickson:

Q. Those that you now refer to in answer to the last question that Mr. Gray asked you, are we to understand that those are the
859 little minor faults that cannot be traced and identified for any considerable distance in any direction?

A. No, they are not precisely the same little cracks to which I referred when I answered your question regarding those.

(Witness excused.)

Mr. Gray: It may be agreed that at some time prior to the commencement of this action the Butte & Superior removed some ore from some stopes beneath the surface of the Elm Orlu claim, and that at this time we will not go into the question of the value of that ore or the amount thereof.

Mr. Dickson: I understand.

Mr. Gray: That is simply for the purpose of laying the correct foundation.

Mr. Dickson: It is conceded also that prior to the commencement of this action the Elm Orlu had mined and extracted ore under the surface and within the boundaries of the Black Rock.

Mr. Gray: I have no knowledge of that, Mr. Dickson.

Mr. Folsom: If it is true, we will admit it, but we have no knowledge of it.

Mr. Dickson: It is small in amount.

Mr. Gray: Those letters that I presented the other day, you have no doubt as to their correctness?

Mr. Dickson: Mr. Kremer will answer as to that. I have not seen them.

860 Mr. Kremer: I find these to be correct in every detail.
Mr. Gray: I offer them in evidence then.

(Letters numbered Plaintiff's Exhibits 53, 54, 55, 56, 57, 58, 59 and 60 admitted in evidence without objection.)

Plaintiff rests.

Mr. Dickson: Before making the opening statement, Mr. Kremer calls my attention to the fact that at the outset of this case we figured that when the plaintiffs had introduced all of their evidence, which was offered and received over our objection, evidence offered for the purpose of giving effect, if possible, to this patent, the United States patent to the Elm Orlu, by relation to a date anterior to its issuance, that we would move to strike all such evidence out. We now make that formal motion to strike out all such evidence.

The Court: If the incompetency or immateriality or irrelevancy of the evidence were obvious, the court would not hesitate to grant the motion, but since there may be room for argument, and the question may be close in some particulars, the court thinks it better to leave this evidence in, and to require you to meet it, so that, whatever the decision of this court may be, the matter may be
861 brought on for a final decision before the higher court. So the motion will be denied.

Mr. Dickson: We take a formal exception, but I fully agree with what your honor says, and we do not desire to argue it.

The Court: Note an exception. Of course it may be fully argued at the conclusion of the case, and the court assumes that it will be.

862 *Defendant's Case.*

Mr. Kremer: At this time I will offer in evidence certified copies of patent to the Jersey Blue and Black Rock.

Mr. Gray: No objection.

Certified copies of patent admitted in evidence and marked Defendant's Exhibits 62 and 63.

Mr. Kremer: Will the plaintiff stipulate and agree that at the date of the application for patent of the Black Rock there was a conflict between the Elm Orlu and the Black Rock as shown by the pleadings herein and that no adverse claim to said application was ever filed by any person whomsoever?

Mr. Gray: No.

Mr. Kremer: You will not so stipulate?

Mr. Folsom: We will stipulate that the lines of the Elm Orlu claim and the lines of the Black Rock claim are overlapped; we will not stipulate that there was no adverse claim.

Mr. Kremer: You will stipulate that there was no adverse claim filed?

Mr. Folsom: Yes, stipulate that.

Mr. Kremer: And that the lines of the Elm Orlu extended over the lines of the Black Rock.

Mr. Folsom: Or vice versa; the lines of the Black Rock extended over the Elm Orlu.

Mr. Kremer: You will so stipulate?

Mr. Folsom: Yes.

Mr. Kremer: Will the plaintiff stipulate that no protest to said application for patent for the Black Rock was ever interposed or filed by any person whomsoever?

863 Mr. Folsom: Yes, so far as the record shows or we know.

Mr. Kremer: Will the plaintiff stipulate that prior to the issuance of the patent to the said Black Rock claim, neither of the applicants for said patent, or their predecessors in interest had ever received any conveyance of any nature whatsoever from any person or persons claiming to own any estate, right, title or interest whatsoever in the said Elm Orlu claim.

Mr. Folsom: So far as we know. The record shows no such conveyance.

Mr. Kremer: Will you stipulate that the public records of Silver Bow County show no such conveyance?

Mr. Folsom: Yes.

Mr. Kremer: And that you know of none?

Mr. Folsom: And we know of none.

Mr. Kremer: Will the plaintiff stipulate that prior to the final entry in the proceedings for the patent for the Black Rock claim, the applicants for said patent had not acquired title by adverse possession to any portion of the area in conflict between the said Elm Orlu and the Black Rock claim?

Mr. Folsom: No.

Mr. Kremer: Do you take exception to "conflict"?

Mr. Folsom: No, we make no stipulation on that subject.

864 We simply stipulate that there were no improvements, so far as we know, on that ground.

Mr. Kremer: Will the plaintiff stipulate that prior to the application for patent by the claimant of the Black Rock and prior to the final entry, that the then claimant and predecessors of the Black Rock claim erected no valuable improvements—erected no improvements and made no improvements and did no work upon the portion of the ground covered by an inter-lapping of the Black Rock and Elm Orlu claims?

Mr. Folsom: We do not say we are willing to stipulate to that. So far as buildings on the surface are concerned we know of none; but so far as other improvements we don't say whether there were or not.

Mr. Gray: We decline to stipulate upon that matter.

Mr. Kremer: But you do stipulate as to the buildings?

Mr. Folsom: Yes.

Mr. Kremer: No surface improvements.

Mr. Folsom: No buildings. But we are not willing to stipulate anything else.

The Court: This ought to really all have been done out of court; that is there should be an agreement——

Mr. Folsom: I have given a memorandum of what we are willing to agree to.

Mr. Kremer: Yes, but that included something we didn't ask for.

The Court: Proceed, Mr. Kremer.

865 Mr. Kremer: Will the plaintiff stipulate that subsequent to the 18th day of April, 1875, and prior to the application for patent and final entry by the Black Rock claim that no amended declaratory statement or other instrument was filed of record eliminating the portion of ground contained within the overlapping of these two claims?

Mr. Folsom: So far as we know.

Mr. Kremer: And you will stipulate the public records show none?

Mr. Folsom: Yes, we will so stipulate.

Mr. Kremer: Will the plaintiff stipulate that the Black Rock claimants or their predecessors prior to the time when they made final entry or final application for patent ever enclosed the area between these overlapping claims?

Mr. Folsom: No.

Mr. Kremer: You will not stipulate that we didn't build a fence on it?

Mr. Folsom: We don't know.

Testimony of W. A. Clark, Recalled, for Defendant.

W. A. CLARK, recalled for defendant, testified as follows:

Direct examination.

By Mr. Kremer:

Q. State your name ?

A. William Andrews Clark.

866 Q. Senator, when did you first know the Black Rock quartz lode mining claim?

A. During the year in which the location was made, 1875, I believe it was.

Q. Did you visit the claim in the year 1876?

A. Yes, sir.

Q. Did you visit the claim in the year 1877?

A. I did.

Q. 1878?

A. Yes.

Q. 1879?

A. 1879.

Q. 1880?

A. 1880.

Q. 1881 and '82?

A. 1881 and '82.

Q. During those years, Senator, was there any work done upon

the Black Rock claim except the work done in the vicinity of the discovery shaft, the northeasterly portion of the Black Rock claim?

A. Up to what year do you include now?

Q. Up to the year 1882?

A. That is, up to the line, the so-called line?

Q. So you will understand what I mean perfectly, Senator, referring to Plaintiff's Exhibit No. 4, I will ask you if any work was done upon the Black Rock claim during the years that I have mentioned in any other place than in the vicinity of the point here marked discovery?

867 A. Most of the work as I recall was done in this vicinity. I had charge of the property part of the time; I don't recall just what year, but I worked this property for sometime, but it was all in that locality. I will not say that there was not any work done elsewhere; there was some prospecting work, I think was done in other parts of the claim, but the larger part of the work performed in the mine was done in that section you refer to, around and not far from the present Black Rock shaft.

Q. I will ask you Senator, if at the time that you and your co-owners or co-claimants made application for patent to the Black Rock claim, if there was in excess of six hundred dollars' worth of work done upon that property?

A. Please state the extent of that time?

Q. I will withdraw the question and ask you if it is not a fact that all of your work prior to your application for patent to the Black Rock claim was not done in the vicinity of the discovery shaft?

A. I think it was done in the vicinity of the discovery shaft.

Q. And no other place at that time?

A. No, I think not, except some prospecting work, as I stated before.

Q. That would be negligible, would it not, the prospecting work that you speak of?

A. Oh, yes, just a mere scratching of the surface.

Mr. Kremer: I suppose it will be admitted that the Clark-

868 Montana Realty Company at the time it sold its interest in the Black Rock to the predecessors in interest of the Butte-Superior Company, that is to say, the Butte-Superior syndicate, received in pay therefor fifty thousand dollars in cash and stock of the par value of two hundred thousand dollars.

Mr. Folsom: I don't see how that is material but if it is a fact we will admit it.

Mr. Kremer: It is a fact.

Mr. Folsom: All right, we will admit that.

Q. Senator, at the time that you and your co-claimants made application for patent to the Black Rock claim, or made final entry thereon, did you have a fence or an enclosure around any part of the Black Rock claim as patented?

A. No, sir.

Cross-examination.

By Mr. Folsom:

Q. I notice in the patent record of the Black Rock claim the statement that at the time of the application for patent there was a tunnel six hundred feet in length on the Black Rock claim. Do you know what direction that ran from the discovery shaft?

A. It ran to the southwest.

Q. In the direction of the Elm Orlu claim?

A. In the direction of the Elm Orlu. I drove that tunnel myself, or had it done.

Q. I will ask you whether at the time of the application
869 for patent to the Black Rock claim there was any controversy between you and the Elm Orlu claimants as to the title to this particular piece of ground.

Mr. Kremer: That is objected to as incompetent, irrelevant and immaterial and not bearing upon any issue in the case.

(Objection overruled; defendant excepted.)

A. There was no controversy whatever of any character.

Mr. Folsom: We will admit that there was no fence down there along that line at the time.

Mr. Dickson: And never had been before that?

Mr. Folsom: Yes, we will admit that.

(Witness excused.)

Testimony of I. Freimuth for Defendant.

I. FREIMUTH, after being duly sworn as a witness for defendant, testified as follows:

Direct examination.

By Mr. Kremer:

Q. State your name?

A. I. Freimuth.

Q. Where do you reside?

A. Duluth, Minnesota.

Q. Mr. Freimuth, do you know the Black Rock claim?

A. I do.

Q. When did you first become acquainted with the Black Rock claim?

870 A. In the fall of 1906.

Q. When did you first visit the Black Rock claim?

A. About the same time, somewhere in the month of October, 1906.

Q. What was the occasion of your visit to that claim?

A. The occasion was that it resulted in my being one of a syndicate that was formed to take over the Black Rock claim with other claims, and formed a corporation which is the Butte Superior Copper Company, Limited.

Q. Please state what, if any, workings you inspected or saw upon the Black Rock claim upon the occasion of your first visit to that claim?

A. I saw workings and inspected workings at that time.

Q. Describe them?

A. The workings consisted at that time of the shaft down to the 500, of more or less drifts and cross cuts. I think mostly drifts as I remember.

Q. Did you go into the workings upon the 500 foot level?

A. I did.

Q. State whether or not that was the deepest working at that time?

A. That was the deepest working at that time.

Q. In what direction from the 500 foot level did you proceed in the drift that you refer to?

A. To the east.

871 Q. Could you state about how far you went to the east?

A. Well, the workings was not very extended at that time; I don't think it was more than perhaps 35 or 40 or it might be 50 feet; it was not extensive on the 500, just 30 or 40 feet was as far as I went—I want to correct that.

Q. Was there an opening or a working made from that drift; in other words was there a cross cut in the drift?

A. Not that I recollect.

Cross-examination.

By Mr. Gray:

Q. Did you go in any workings except the 500?

A. Yes.

Q. What?

A. In what they called the 150, and if I recollect right, also the 300.

Q. And you say there at the 500 there was what you call a drift?

A. Yes, a drift.

Q. Some 35 feet, if I understand you?

A. Well, it might have been deeper, but we did not go in very far.

Q. You went as far as you could?

A. No, I don't recollect that I did; I don't recollect that we did go the full length of the drift.

Q. Well, you went as far as it was open, didn't you?

872 A. Well, the air was bad, and we did not go very far.

Q. There was not anybody working down there?

A. They were working, I believe, on some other level.

Q. Did you see any men working on the 150?

A. No, not on the 150.

Q. Well, on the 300?

A. Well, I think they were working, if I recollect right, on the 300; I think they were taking out some ore at the time.

Q. Did you see them working there?

A. I saw some men working underground at that time, but I couldn't say——

Q. You don't know what they were doing?

A. I wouldn't be positive exactly at what point.

Q. That was a small two compartment shaft that you went down at that time?

A. A small two compartment shaft.

(Witness excused.)

873 *Testimony of John H. Simpson for Defendant.*

JOHN H. SIMPSON, after being duly sworn as a witness for defendant, testified as follows:

Direct examination.

By Mr. Kremer:

Q. State your name?

A. John H. Simpson.

Q. Where do you reside?

A. Butte.

Q. How long have you resided in Butte?

A. Well, continuously since 1900.

Q. Do you know the Black Rock quartz lode mining claim?

A. Yes, sir.

Q. When did you first become acquainted with that claim?

A. In the fall of 1903, if my memory serves me right.

Q. From that date what, if any, connection did you have with the operations conducted on that claim?

A. I was interested with others in the lease.

Q. A lease from whom?

A. From Senator Clark and his co-owners.

Q. Under what name did you operate that property?

A. The lease, I think, if my memory serves me right, was taken in the name of O. K. Erle, of Minnesota, and a gentleman from Chicago whose name I cannot recall, and then they organ-

874 ized what we called the Black Rock Mining Company, which was a leasing company, and the operation of the lease was carried on under the name of the Black Rock Mining Company.

Q. During the operations of the Black Rock Mining Company, then, referring to the leasing company, what, if any, connection did you have with those operations?

A. Well, I was vice-president of the company, and had more or less control of the operations.

Q. Describe very briefly, Mr. Simpson, the workings upon that property in 1903 when the operations of the Black Rock Leasing Company began?

Mr. Gray: I don't object to this if counsel thinks it is material. I don't see the materiality myself.

Mr. Kremer: We will show the materiality later. I will be as brief as I can. It involves a question which we will urge in argument, a mixed question of law and fact.

The Court: Proceed.

Q. State briefly the workings at that time?

A. The mine had been shut down for a number of years. I don't know how many, and there were no improvements, if I remember right, except a wooden gallows frame at the same point that the present shaft is; then some feet further east was another little shack and another gallows frame. I think that was all the improvements.

875 Q. How about the underground workings?

A. They were in fair condition.

Q. How deep were they?

A. 400 feet, the way they numbered them.

Q. Well, did the numbers represent the actual depth approximately?

A. No, I rather think they were 50 feet off, if my memory serves me right.

Q. Short or long?

A. They were short.

Q. During the year 1903 what, if any, work did the Black Rock Mining Company or leasing Company do in that shaft or what workings from that shaft?

A. I rather think it was the latter part of 1903 that we took over the lease, and I think that we just got our machinery, a little plant, and retimbered and fixed up the shafts; I don't think they did a great deal of mining during that year.

Q. In 1904, describe what you did briefly?

A. We further developed, and gouged out some chutes of ore and shipped them.

Q. Upon what level?

A. Well, we did get some, I think, on the 150. We did not get any on what was called the 350.

Q. Were your operations east of the shaft or west of the shaft or both east and west?

A. East altogether.

Q. During the year 1905 what did you do with reference

876 to the development or extension of the property?

A. We extended a tunnel from the gulch on the north side that had been run quite a ways—we extended that to the shaft, and tapped the shaft at 140 feet from the collar, and did some mining in there also.

Q. Did you do any sinking?

A. Yes, we sunk to the 500, what we called the 500 foot level, with a 12 foot sump.

Q. When was that done?

A. That was in the latter part of 1905 or the early part of 1906, but I rather think 1905.

Q. State when your Black Rock Leasing Company ceased to do business, ceased to operate upon this property?

A. On the formation of that syndicate from Duluth.

Q. Formed for what purpose?

A. To take over the property.

Q. Is that the syndicate that Mr. Freimuth referred to as the Butte Superior syndicate?

A. Yes, they afterwards organized as the Butte & Superior.

Q. Was there any further work done upon that property than you have described during the time that the Black Rock Leasing Company operated it?

A. We drifted east on the 500, on the north wall as we regarded it, the foot wall.

Q. How far did you drift east?

877 A. My recollection is about 300 feet, but that is indefinite; I have not had a chance to refresh my memory on that.

Q. Do you know what time in the fall of 1906 you ceased operations?

A. It must have been along in September or October.

Q. And who continued the work, if anyone?

A. The syndicate that I referred to was furnishing the means to carry it on after about September or October.

Q. The Butte & Superior syndicate?

A. Yes, sir.

Q. Did you crosscut on the 500?

A. At the end of the drift, yes, sir.

Q. How extensively did you crosscut?

A. Crosscut to the other wall.

Q. How wide was the vein?

A. If I recollect it was something like eighty feet; might have been a little more.

Q. What, if any, other connection did you have with the operation of that property after the Black Rock Leasing Company passed out of existence?

A. I was on the advisory board of development for about a year.

Q. Of what company?

A. Butte Superior Company.

Q. And how deep were the workings when you ceased your connection with the advisory board?

878 A. About 700 feet.

Cross-examination.

By Mr. Gray:

Q. That is the shaft was down 700 feet?

A. Yes, sir.

Q. You didn't open up any levels between the five and the twelve?

A. No, sir.

Q. You said something about crosscut from this drift on the 500. In what direction did that crosscut run?

A. It run south.

Q. You say you crossed south on the 700. Now, how far from the shaft was it where you crossed to the south?

A. Well, I was judging about 2000 feet. I haven't refreshed my memory as to these things. I haven't got notice to do it, but that is my recollection; 2000 feet or thereabouts.

(Witness excused.)

Mr. Kremer: Will the plaintiff admit that the first publication of the application for patent of the Black Rock was in July and the last was in September?

Mr. Folsom: If you don't introduce that record of the Black Rock we shall introduce it, so you might as well introduce it.

879 Maps offered by Defendant marked Defendant's Exhibits 67 to 84, cross sections marked Defendant's Exhibits 85 to 90, Large model marked Defendant's Exhibit 91, small model marked Defendant's Exhibit 92.

Testimony of Arthur B. Clark for Defendant.

ARTHUR B. CLARK, after being duly sworn as a witness for defendant, testified as follows:

Direct examination.

By Mr. Kremer:

Q. State your name, Mr. Clark?

A. Arthur B. Clark.

Q. What is your business or profession?

A. Mining.

Q. How long have you been engaged in mining?

A. Since 1893.

Q. How long have you resided in Butte and vicinity?

A. I first came to Butte in 1879, and I have been here more or less ever since, except seven years from 1903 to 1910 in Colorado.

Q. How extensively have you engaged in mining?

A. I have followed it as a miner and mine manager ever since 1893.

Q. During that time have you operated a good many properties and engaged in operating a great many mines?

880 A. Yes; I have operated in the Highlands first, and then in the Granite mine at Princeton, and also at Garnet.

Q. Do you know the Black Rock mining claim situated southeast of Butte?

A. I do.

Q. How long have you known that claim?

A. Well, my first recollection is about 1888 or 1889.

Q. What connection did you have with it in 1888?

A. Nothing except that I remember that my father had leased

the mine at that time to Senator Clark, and I was up there with my father a great many times.

Q. Who was your father?
A. H. S. Clark.
Q. He is dead?
A. Yes, sir.
Q. Is he the same H. S. Clark who was one of the original promoters of the Black Rock claim?
A. Yes, sir.
Q. Does whether or not you have ever conducted mining operations upon the Black Rock claim?
A. In 1899, I think in July, Mr. W. C. Roberts and I obtained a lease from the owners of the Black Rock, and I had charge of the property during the time, and we operated it jointly for about two months, when I bought Mr. Roberts's interest and operated up to March, 1900, myself, and then subleased it to Thomas Norton & Company, who operated it until July, 1901.

Mr. Kinney: I will state if your honor please at this time that Mr. Clark is not introduced as an expert witness, but we merely as a witness to the facts.

Q. Upon what portion of the Black Rock claim did you conduct operations under the lease?
A. Upon the northeasterly portion of the claim.
Q. Referring Mr. Clark, to defendant's exhibit 62 I will ask you to state if you can identify any workings appearing thereon that you made during the period of your operations under the lease to Lowell?
A. Yes sir, I can identify the caved stope as being a portion of my work.
Q. Where was the caved stope with reference to the east end line of the Black Rock?
A. About 270 feet from the east end line to the shaft.
Q. How far south of the north side line of the Black Rock?
A. About 200 feet.
Q. Through what opening did you operate under the lease?
A. We sunk a shaft with a cribbing 6x6, but down on that stope we sunk the new one and also drove a drift and about fifty feet.
Q. What was the location of that shaft upon the Black Rock claim, Republic 1?
A. Well, the shaft seems to now at the present time but there is a road, the old road, and a portion of an old log or an old timber that I placed there, identified to the old road is the portion of the plat that is still visible here.
Q. Can you identify the location of that shaft upon plaintiff's exhibit 10?
A. Yes, sir.
Q. Will you so identify it and mark at the point of that shaft your number 6, B. C.

(Witness indicates.)

Q. That shaft is how far from the east end line of the Black Rock claim as it appears upon defendant's exhibit 42?
A. 270 feet.
Q. And how far south of the north side line?
A. About fifty feet.
Q. Was that a vertical or an inclined shaft?
A. It was a vertical shaft.
Q. To what depth was the shaft sunk by you?
A. Fifty feet.
Q. Do you know during what year?
A. 1899.
Q. From the fifty foot level of that shaft, what, if any, workings did you make underground?
A. I drifted east about sixty feet and west about eighty feet.
Q. What did you drift on?
A. Ore.
Q. Was any stoping done east of that shaft?
A. That was stoped close to the surface within—well, to the south, there was eight or twelve feet of wash or bedrock.
Q. And west of the shaft was any stoping done?
A. Well, that was west of the shaft.
Q. What stoping was done east of the shaft?
A. There wasn't any done under my operations that I remember of.
Q. How much ore did you take out of the stope west of the shaft, approximately—referring to it by cars or some way?
A. I bills over eight hundred tons up to March, 1900.
Q. Have you the records of those shipments?
A. Yes, sir.
Q. Have you them here?
A. Yes, sir.
Q. Will you produce them?

(Witness produces records.)

Mr. Keenan: They are here for production if they are desired. I don't see as there is any necessity of encumbering the record unless counsel wants to make of it.

The Court: You can state what they show so far as you desire it and the opposing party may examine them.

Mr. Keenan: State what appears here?
A. These are records of ore shipments made to different smelters—to the Elko Gold & Silver Mining Company, Montana Ore Purchasing Company, and the Tacoma Smelting Company—of ore that was shipped during 1899 and 1900.
Q. Approximately the number of tons that you have mentioned?
A. Yes, sir—well, I shipped up to March, 1900, approximately 800 tons.
Q. Who succeeded you in that operation?
A. The Thomas Newton Company.
Q. Before passing, Mr. Clark, to the questions of your successor,

state what was the character of the ground through which you sunk that shaft with reference to whether or not it was in ore?

A. The shaft was in ore.

Q. How far from the top did the ore appear and how far did it continue into the deep?

A. The ore appeared right under the wash, about eight to twelve feet of over-burden and from there on to the fifty foot level I was entirely in ore.

Q. What work was done, if you know, by your successors on that raise?

A. They sunk that shaft fifty feet deeper, to the 100 foot level.

Q. And state whether or not the additional fifty feet was sunk in ore or through the country rock?

A. It was sunk in ore.

Q. And what workings extended from the shaft when it attained the depth of 100 feet, if any?

A. Well, they continued to stope the ore to the fifty foot level.

8855 Q. In what direction?

A. Well, up to July, 1900, west, they were stoping west of the shaft.

Q. Did you see that stope?

A. I didn't see all of it; I saw a portion of it at times.

Q. During the time that they were operating?

A. Yes, sir.

Q. And what have you to say with reference to the composition of ore in the stope at the time you saw it?

A. Why, the stope was from ten feet to twelve feet wide, in places sixteen feet wide.

The Court: Where was that?

A. In this mentioned as the cave stope, there was ore in that shaft, from the 100 foot level up to the surface.

Mr. Kremer: I was asking particularly in reference to the 100 foot level, the workings from the 100 foot level to the west? What was the character of that ore generally, Mr. Clark?

A. It was a silicious black manganese or manganese and quartz and carried from sixteen to twenty-six ounces of silver and around a dollar of gold, eighty cents to a dollar.

Q. When did operations under your lease cease, if you know?

A. I don't remember whether that lease was for one year or two years. I know afterwards it—afterwards there were other

8856 lessors worked in that same shaft but I wasn't here at that time.

Q. After you had ceased operations under that lease state when you next conducted operations or were connected with the operations conducted upon the Black Rock claim?

A. In 1912.

Q. In what connection was that?

A. I was tracing surface veins and making maps of the surface work, mostly north of the Black Rock, on claims that were bought by the Butte & Superior Company.

Q. During the time or immediately preceding the time of your operations under the lease referred to, did you make an examination of the surface of the Black Rock Claim with a view to identifying the course of the vein upon which you subsequently worked?

A. Yes, sir, in doing this work—the course of that vein was along the side line—south of the side line of the Black Rock, and I called my father's and Mr. Wethey's attention to the fact——

Q. Who was Mr. Wethey?

A. Mr. A. H. Wethey, who was general manager for Mr. W. A. Clark at that time.

Q. The same A. H. Wethey who is connected with the Clark-Montana Realty Company?

A. I don't know as to that.

Mr. Kremer: You will admit that Mr. Wethey is vice-
887 president of the Clark-Montana Realty Company, one of the officers of that company?

Mr. Folsom: Well, if it is a fact. I don't know anything about it.

Mr. Kremer: Well, he was.

A. I called his attention to the fact that if this vein and large ore body had been known at the time of the Black Rock-Niagara case, it would have put an entirely different light on that case, and probably would have won it, because it was clearly within the lines of the Black Rock, and the discovery shaft of the Four Johns, not shown on this map, was lined out very nicely with this vein that I worked upon, and I particularly called attention to the fact that it went through the east end line.

Q. You say it went through the east end line?

A. Well, the strike of it was through the east end line.

Q. Where is the Four Johns claim?

A. East of the Black Rock.

Q. And where is the shaft upon it?

A. It is about 40 feet east of the end line of the Black Rock, and I think about 90 feet southeast of the northeast corner of the Black Rock.

Q. To what point west of the shaft through which you operated did you trace that outcrop or vein?

A. Well, there was a large cave right in below the dump, I should say about at this point.

Q. At the point of discovery?

888 A. Yes.

Q. In driving the drift that you refer to, Mr. Clark, I will ask you to state what was the condition of the face of the drift when you ceased operations?

A. In which direction?

Q. West?

A. West the face of the drift was in ore.

Q. And east?

A. It was in ore.

Q. It was in ore in both directions?

A. Yes, sir.

Q. State the character of the ore; what was the character of that vein?

A. It was a black manganese and quartz ore. In *In* the west face we shipped that ore mostly. In the east face it was similar, except that in the north or foot wall of the drift—it was not a foot wall—there was a gouge of soft sooty black manganese there.

Q. You stated that the shaft which you sunk was a vertical shaft?

A. Yes, sir.

Q. To what point, about 50 feet—what was the condition of it below that; did it proceed down in the same vertical direction?

A. Yes, sir.

Q. A continuation of the shaft that you sunk?

A. Yes.

Q. Was the gouge that you referred to mineralized; did it have any value?

889 A. I remember of getting one high assay out of that gouge, some 60 ounces in silver.

Q. About how far east of the shaft was it that you procured that sample that you refer to?

A. I should say about 30 feet.

Q. In that same drift that you have described?

A. In that 50 foot drift east, yes, sir.

Q. What was the condition of the hanging wall, or what was the condition of the vein in the hanging wall?

A. Why, it was altered granite.

Mr. Dickson: You mean the south wall?

Q. Yes.

Mr. Dickson: Perhaps you had better call it the south wall.

Q. You were referring to the south wall?

A. Yes, the south wall. The vein had a slight dip to the south.

Cross-examination.

By Mr. Folsom:

Q. Mr. Clark, what did you call that vein that you took the ore from at that time?

A. We called it the Black Rock vein.

Q. Where was the Stoner vein?

A. I think the Stoner vein was west of that; I am not sure on that point.

Q. You spoke of the litigation between the Black Rock and Niagara; don't you recall where the Stoner vein was contended to be in that direction?

890 A. I remember hearing that testimony and reading of it, but I have not refreshed my memory on that. I don't know where the Stoner vein is at the present time.

Q. When you had the conversation with these people about the Black Rock-Niagara, didn't they tell you that that contention had

been made by the Black Rock in the litigation between the Black Rock and Niagara, and that the Stoner vein was in the same position substantially as you found this vein that you say you stoped ore out of?

A. No, sir; this vein was not known at that time; the apex of that vein was not known at the time of that lawsuit; it was discovered afterwards.

Q. How do you know?

A. I was familiar with it there and know when this work started in 1899.

Q. Don't you recall that the model in that case showed that vein practically in that position, and that that was one of the principal issues in the case?

A. No, sir, I do not.

Q. Don't you know that they attempted to show that that was connected with the main vein?

A. My recollection is that I called my father's and Mr. Wethey's attention to the fact that there was no work shown on the model in that case that went far enough to reach that vein in the lower levels.

Q. Where was the discovery shaft with reference to the work that you did?

891 A. I don't know—there was no discovery shaft visible at that time. There was a cave at the point indicated as discovery shaft on this map there.

Q. What was the direction of the gouge on the walls of the vein that you worked?

A. It was not a gouge; it was a sooty black manganese; there was no talc in it; the direction was easterly and westerly.

Q. What was the depth of the shaft that you sunk?

A. 50 feet.

Q. Do you know whether or not the cave that you refer to was connected with any old workings?

A. The discovery cave?

Q. Yes.

A. I don't know of my own knowledge, except from the surface; I know it was a large cave there.

(Witness excused.)

Testimony of John W. Finch for Defendant.

JOHN W. FINCH, a witness called on behalf of the defendant, being first duly sworn, testified as follows:

Direct examination.

By Mr. Dickson:

Q. Give your name, age and residence, Mr. Finch?

A. John W. Finch; nearly forty-three years old—forty-two years; residence, Denver.

892 Q. What is your profession?

A. Mining geologist and engineer.

Q. Where did you study your profession of mining geology and engineering?

A. At Colgate University and the University of Chicago, taking graduate study in the latter and academic work in the former.

Q. When did you graduate?

A. I graduated in '97 in the bachelor degree.

Q. Go ahead and state all about your scholastic career?

A. That is about all there is to it. That was followed by special study—well, previously in Colgate University the subjects which are usually included in the education of a geo*gol*ist and engineer were followed. These studies were pursued further in the university of Chicago, especially the study of geology for a period of little less than two years in the University of Chicago.

Q. Did you at any time hold any professorship in any university of geology?

A. It wouldn't exactly be termed a professorship. I was instructor in both of the universities which I have mentioned in geology and in physics and mathematics.

Q. For how long a period were you an instructor, taking the two universities together?

A. I was instructor in both of them during the period in which I was taking post graduate study. I have been back to the
893 University of Chicago since to deliver certain lectures upon mining and mining geology.

Q. To what extent, how constantly since your graduation and since you ceased to be an instructor in either one of the institutions you have mentioned, have you followed your profession of mining geologist and mining engineer?

A. I have followed it constantly.

Q. State generally, without going into any unnecessary details, the experience you have had, in what countries, what places, what mines you have been connected with of importance, if any, in directing operations, mining operations, development work and so on?

A. Well, briefly, my entire life since my college days has been occupied in the business of mining and directing mining and examining mines and of studying in connection with the examination of mines, the value of ore deposits, and reporting upon them, and the nature of ore deposits, as to their geological character, and reporting upon them. Such work has taken me into the majority of the mining districts of the western mining districts of Canada, many of them, and many points in old Mexico and certain other points of no great importance.

Q. Are you familiar with the surface and underground workings of the Elm Orlu and Black Rock claims?

A. I am.

894 Q. When did you first make an examination of either one of these properties, surface or underground, or both?

A. Well, the first real examination was about—something like three years ago. I have some memoranda with me which will tell

me exactly. I have been in the vicinity of that ground at a number of times before without making any specific examination of these two claims.

Q. About three years ago you made your first specific examination of these two claims?

A. Yes.

Q. What was the occasion of that examination; by whom were you employed and for what purpose?

A. By the Butte & Superior Mining Company for the purpose of ascertaining the nature of the—what we call the Black Rock vein and to find its position, trace its continuity in the ground.

Q. How much time since that have you devoted to an examination of these properties, to the underground workings and to a study of the geological conditions which you observed?

A. I cannot give that in detail. I have visited the mine a great many times and have followed new developments as they have progressed, so that in the aggregate it would possibly be se-eral months altogether.

Q. Actual study on the ground?

A. Yes.

895 Q. I wish you would now, without further interrogation, Mr. Finch, in your own way, *taking* up the order of discussion as it may seem most orderly to you, and give the court the result of all of your observations, both as to the vein at the surface and beneath, thereon? You may refer to any maps or exhibits and when doing so, give the number of the exhibit which you are referring to?

A. If it is entirely permissible to do so I think my subsequent statement which I may make as to the veins and other features in the mine might possibly be best prefaced by a general explanation of what I consider to be the nature of the Black Rock vein and the Elm Orlu vein.

Q. Right there, to save repetition, when you speak of the Black Rock vein what vein is that as referred to by the witnesses for the plaintiff?

A. It corresponds in part to a vein which has been described by the witnesses for the plaintiff as the Jersey Blue vein.

Q. And the Elm Orlu vein that you speak of, is that the same vein that is referred to by the witnesses for the plaintiff as the Rainbow lode or Rainbow vein?

A. In part.

Q. Well, proceed.

A. I might possibly make it clearer by extending that statement somewhat, in further explanation. The Black Rock vein

896 as shown upon defendant's exhibits will be found to be a vein which at all levels from the surface to the bottom of the mine is a vein extending lengthwise of the claim, entering its west end line and passing out its east end line and corresponds with a part of the representation in red upon plaintiff's exhibits which has been called the Rainbow lode.

Q. What part is that; describe it so the record will show what part of it you are now referring to?

A. Referring particularly to practically all of the representation of the Rainbow lode upon plaintiff's exhibit 4, surface map, laying southeast—lying mostly east and northeast of the Black Rock shaft.

Q. Proceed.

A. The Black Rock vein is not identical with the vein referred to as the Jersey Blue vein in another particular which I will explain more fully later. A vein which exists on the Jersey Blue claim and which has a northwesterly strike into that claim some distance, four hundred feet or thereabouts west of the east end line of the Jersey Blue claim is, in my opinion, another vein altogether.

Q. Another vein from what?

A. From the Black Rock vein.

Q. Or the Jersey Blue, as spoken of by the other side?

A. Yes. In other words, the Jersey Blue vein as described by the plaintiff's witnesses and shown upon this surface map is, I
897 believe, made up of two separate veins. The Rainbow lode as described by plaintiff's witnesses is identical with what defendant's map will call the Black Rock-Elm Orlu vein up to the point where it will be indicated upon various exhibits the Black Rock vein and the Black Rock-Elm Orlu vein unite into one. East of that point it is called upon defendant's exhibit the Black Rock vein. All the veins which have already been referred to and to which I will refer are fissure veins. There are in the world certain other classes of deposits which do not come under the same designation. I wish to make it clear, if possible, in advance my understanding of a fissure vein or what may constitute a fissure vein. There are two stages in the formation of a fissure vein, obviously, the formation of the fissure itself and the formation of the vein in the fissure. The fissure does not become a vein until something different from the rock through which it passes is introduced into the fissure. Fissures in their form depend upon the nature of the material through which they pass. They are formed over a great part of the earth's surface and are probably in process of formation at all times but it is only in the rare and special districts of the world that they become anything more than fissures. There are certain places in the world where cracks are formed extending to a considerable distance through the rocks and always remain cracks. There are other places, such for instance, as the Cripple Creek district in Colorado, where such mere cracks of no great
898 displacement — apparently just caused by the jarring of the earth as the final expression of dying volcanic force in the district. Such cracks have become routes of free access for the circulation of solutions which have been rich in gold and such cracks, no wider than the drawing which I am making, are so rich in gold that they become individual veins. This type of vein is made up practically of the filling of the little open cracks in the rocks. There is another type which exists in Cripple Creek where the veins are not fault veins, where the cracking of the country causes individual fissures to be formed which are of no great length, but which are

linked together by other little fissures forming what we term in the Cripple Creek district offset veins.

The ore in such a fissure is likely to form along the cracks, and does so form, and from such a fissure moreover, the ore of the vein extends out in little seams in the rock, so that a particular individual fissure may end, and the ore deposit and vein matter may end with it. At a particular place the rock may be granite, and its joint cracks, which existed before the vein formed, may have been sufficiently open, and are sometimes found sufficiently open so that the cracks out from the vein are filled with ore also, and the vein, for commercial purposes, may include a considerable width of rock permeated by small seams exceedingly rich in gold.

There are other districts in the world, of which the Butte
899 district is one, in which a still more complex form of vein has been developed. The earliest type of vein in the Butte district, concerning which plaintiff's witnesses and myself will have no controversy, is a type of vein which is not a fault fissure, but a type of vein formed in the rocks apparently by the slight disturbance due to the subsidence of volcanic activities, and the dying away of the heat accompanying the intrusion of this great mass of granite. Such fissures are similar, so far as the fissure structure is concerned, throughout the Butte district; as far as the ore deposition is concerned, there is quite a variation between those in the copper area and those in the districts under consideration. These fissures all have, as far as my recollection goes, a southerly dip; they all have enough of an east and west strike at various points so that the use of the term east and west veins has been made a generic term; it means veins of the oldest type. Now, the veins of this type, in this instance under consideration and in other places, are at any particular point individual veins, but they do have the habit of uniting on their strikes and of uniting on their dips as they naturally would, having been formed all at the same time. In the formation of these veins it is also clear that there was a structure in the granite of the district which had some considerable influence upon their structure and form. An individual crack through the granite formed in such a position as this (drawing) another indi-
900 vidual crack in the granite formed in such a position as this, not fault fissures, but nevertheless distinct and individual fissures. There seems to have been in the granite in advance of the formation of these fissures, or at least during the time of their formation, a structure developed in the granite, which at certain places made individual fissures of the east and west type approach each other and combine; a transverse structure. That transverse structure is not only manifested by the mechanical breaking of the rock in the wedge included between two approaching and joining veins, but also in certain places where these veins are broad it is found to show as a structure across the ore. Now, this sketch which I have drawn is only intended to illustrate the apparent form of the fracture in which the east and west type of vein has been deposited; in other words, the most ancient type of vein. The process of mineralization of a fracture of that kind can be traced in some cases in

the mines. The old and comparatively defined fissures apparently are filled up first; in some cases it is clear that they were filled up first; then the mineralization began to gradually spread out from it into these open cracks, which are not cracks containing gouge and clay which would dam up the free circulation of the solutions to any great extent; they were open cracks. Sometimes in the period of their formation, that stage of the mineralization would be found (drawing); at another stage the mineralization of this ancient vein system, it is found that the solutions which deposited the ore,
901 not being dammed off or prevented from free circulation, soaked out into the granite either way, so that at regions of particular fracturing in the old vein system they have formed in some cases a perfectly solid mass of ore between the two fissures which are approaching and uniting into one. We find all stages in these mines, between the rather defined filling of an ancient fissure and the spreading out and eating into the granite from that fissure from two or three hundred feet in maximum cases, and we find all stages from poor mineralization up to commercial ore, in the narrow form sometimes in fissures, and in the extensive form of the replacement of the granite out from the fissures.

The characteristics which I have described or attempted to describe of the mechanical form of the fissuring and the chemical results of the circulation of the solution and the deposition of the ore apply—all of those apply equally to the vein which I shall describe as the Elm Orlu and the vein which I shall describe as the Black Rock, and as the maps are reviewed, instances will be pointed out in each vein.

There is another type of vein, the next oldest in the Butte district, which it seems to me it is not necessary to illustrate.

Mr. Dickson: I will have this sketch marked.

(Sketch marked Defendant's Exhibit No. 93.)

902 Mr. Dickson: I offer it in evidence.

(Sketch Defendant's Exhibit No. 93 admitted in evidence without objection.)

The Witness: The other type of fissures and fissure veins which have been mentioned already and quite fairly described, is the series of veins crossing the Butte district in a north westerly direction, sometimes known as the Blue Vein series. These are fault veins, and they differ from the ancient Black Rock Elm Orlu vein in many particulars. All of those details of character and of difference which have been described I agree with perfectly, but I do say with great emphasis that the vein which has been described as the Jersey Blue vein, that part of it which exists in the west end of the Black Rock claim, is not a vein of that type, and lacks every one of the characteristics which have been recited as of the Blue Vein system.

Q. Before you leave that, Mr. Finch, point out the difference in the characteristics in what we call the Black Rock and the other side

calls the Jersey Blue vein with the northwest system of veins which you say are fault veins?

A. One of the most striking characteristics of the northwest fault veins is the fact that the ore is deposited practically all between the walls of the fissure and is a replacement of the fault material of the fissure; that it is apparent that the walls of the fissure has been smeared with the clay of the fissure, and the solutions have not to any great extent escaped into the adjoining rock. Fault
903 fissures, which usually have two defined walls, and many times an internal fissuring, as is characteristic of fault veins in general—such a characteristic is totally absent from what I shall describe as the Black Rock vein at points west of its junction with the Elm Orlu vein, and in the development made by the defendant company.

By the Court:

Q. Do I understand you to say that the Black Rock vein as delineated on your Exhibit 64 is a different vein from the one the plaintiffs have delineated on their exhibit as the Jersey Blue vein?

A. The vein coincides with the vein described by the plaintiff as the Jersey Blue vein in an area about 300 feet west of the east end line of the Jersey Blue, and thence through the Black Rock claim to what I shall call the region of junction, around the Black Rock shaft. Northwest of that in the Jersey Blue it is another vein.

Q. I understand you now.

A. As to the matter of the characteristics of the northwest fault veins and the inclusion of mineral material between the walls of them, exhibit 64 illustrates as well as anything through the mine the difference between the east and west ancient vein and the northwest fault veins. Immediately below the surface in the regions of the east end line of the Jersey Blue claim and the west end line of the Black Rock claim are some tunnels, particularly a tunnel called the Dewey tunnel, which I may describe in greater detail
904 later. In that tunnel this part of that Black Rock vein coincides with the Jersey Blue vein as described in that region, has one defined wall; extending down to the southward from the main commercial part of the vein, in a heavily mineralized part of the vein is an absolutely typical case of the spreading of the ore solutions into the granite, stringing off into off-shoots and saturating the granite around through its joint planes; in other words, there is no definite boundary which can be fixed to that zone of mineralization south of the main Black Rock fissuring.

Exactly the same condition is found in the Elm Orlu vein itself where between two branches of it on the surface the granite has been fairly permeated with solutions; in an area represented on plaintiff's map, in the region of trenches B and C, the nature and appearance and character of the two veins at the point just indicated, for illustration, are absolutely identical. Another characteristic of the blue vein which I think goes without any exception—it does at least in my recollection and I have seen most of them—is that they begin to be productive at a very considerable depth in the earth,

and that they do not, as has already been stated, customarily contain either ore or a great quantity of vein matter as they approach the surface. They become definitely fault fissures as they approach the surface.

9935 By Mr. Dickson:

Q. Barren fissures, you mean, near the surface?

A. Yes; in other words, the solutions which formed the ore in them have clearly been able to operate upward only to a certain horizon, and ended there in a majority of cases; so that the productive points in the northwest veins although not always at anything like the same horizon, nevertheless they do end upward at a great depth from the surface, a very considerable depth from the surface.

Now, the vein which is marked upon defendant's exhibit 65 Black Rock vein in the tunnel immediately below the surface and—it would be better to refer to Defendant's Exhibit 65, because immediately below the surface in the tunnel work—in that part of the vein developed in the Black Rock tunnel, that part of the vein at the point where the words "Black Rock vein" are placed upon the map, is to a very large extent commercial ore, masses of solid ore in it.

Q. How near the surface?

A. Within a very few feet of the surface, and that same character of ore which is found a very considerable part of all the developments upon this vein; it is a distinction which is very marked between this vein and veins of the northwest fault type.

It has been stated that if the vein which is delineated upon Defendant's Exhibit 65 were a northwest vein, it would not be affected by cross faults of the blue vein type. That is true; if those were the conditions, such would be the case. But the developments near the area which has been covered by the development of the Black Rock vein west of its junction with the Elm Orlu, are in an area in which no northwest veins exist, and neither the Black Rock vein nor the Elm Orlu vein have been faulted. In other words, in that respect the Black Rock vein and the Elm Orlu vein are identical in character.

Q. You say that in that area neither has been faulted by a northwest-southeast vein?

A. Neither of them has been. There is a northwest vein shown in the vicinity of the Black Rock shaft, and another northwest vein is shown passing through the region of tunnel R, and it will be seen that their directions are such that they include between them a certain length of the Black Rock vein and a certain length of what we call the Black Rock Elm Orlu vein, neither of which should be, and neither of which is affected by a vein of the Blue vein class.

It has been stated that the vein which has been described as the Jersey Blue vein is proved to be a fault vein because it intersects certain ore bodies. In connection with the description of some of the maps that will be gone into more particularly, but I wish just now at this particular time to show that the Jersey Blue vein itself

as described by plaintiff's witnesses and the Black Rock vein which I shall attempt to describe, is also — it is faulted by a perfectly clear and well-known northwest vein of the Blue vein type, namely, at a point or in an area in the Black Rock tunnel as Exhibit 65 shows the Deadwood vein is found to cut through it and dislocate it.

Q. Do you recognize and regard the Deadwood vein as belonging to the same system or northwest-southeast system?

A. Yes, undoubtedly. There is a considerable amount of development done upon it in the mine in which its character as a fissure vein is very distinctly shown, its mineralization lying definitely and distinctly within its walls.

Mr. Gray: Would you mind indicating the station number at that point where you claim the vein is faulted?

A. This is the only level upon which that is shown because—because the dip of the Deadwood vein is such that it passes to the east of the junction of the Black Rock and Elm drifts as you go deeper in the Black Rock mine. But in this tunnel level, exhibit 67, the Deadwood vein is first shown on a shaft in some old workings near the mouth of the Black Rock tunnel. Tracing along southeasterly from this working it does, as these veins usually do, scatter into more than one fault fissure. One of the branches of it is shown near station 780 where the main part of the Jersey Blue vein is faulted and thrown to the northward as you pass east. An other branch of the fault extends through station 780—almost exactly—and faults the Black Rock vein again, throwing it to the northward, as the fault does in that case in all levels down through the mine. At station 800 another of the branches of the fault dislocates the northernmost strand of the branch of the Black Rock vein itself. In this connection, now that the subject has come up, it might be well to explain that the Black Rock vein at all points where it has been developed approaching the Elm (sic) vein does itself spread into a number of branches, easily seen where they are developed, easily discernible. These several strands or branches of the Black Rock vein have been dislocated by the Deadwood vein and on this particular exhibit, defendant's exhibit 67, they have both in turn been dislocated by the Black Rock fault. I may say in that connection, Judge Dickson, if it is not too much of an interruption, that since the exhibits are beginning to be referred to there are certain things which might possibly be explained. The red lines shown upon all the exhibits is vein material. The blue shown upon all the exhibits, as is customary in the mapping of the Butte district, represents faults or fault material and represents barren fault material, not mineralized. In other words, all the blue lines shown upon all of defendant's exhibits represent what I believe to be fault movement which has taken place since all of the mineralization of all of the veins. A certain design, a sort of crisscross design in black, bordering and also along other workings represents granite which is unaltered, which is fresh, which has not been affected by mineralizing solutions in any de-

two more or certain point into coalescence. The second gouge of the post-mineral fault coming from the west can be traced into a single fault in some cases. The Butte Superior (1000 foot level, showing to exhibit 73, gouges which are shown in the 1100 foot level just above in the Elm Orlu, a very long one over there, referred to as the Black Rock fault, and an exactly similar fault along the north wall of the Black Rock vein, equal in size and importance and containing precisely the same broken fragments, unites with it in the region of the "J" of the "1000," they unite together. Passing onward into the Black Rock mine through the end of the level these faults, post-mineral faults will be found again to a certain extent by the pre-existing structure of the ore, but also cutting across from point to point transversely through the ore in many places. Now, before the subject of the gouges of the Black Rock fault period is discussed I should like to say that there are also formed certain post-mineral slips between the two planes. These also are largely guided by the structure which exists in the vein. They will (63) be found placed upon the way in very few lines and they are all through the stopes, in any stope into which a man may go he will find these little transverse slips forming through the structure of the vein. They are perfectly natural things and have formed in connection with the dislocation by the Black Rock fault of these ore bodies. On the 1200 foot level of the Black Rock it will be seen through the ore that there is a series of such little slips very closely united by the formation of slight gouges along lines in the vein or in the country, which are ordinarily more or less shaped by the structure in the ore or structure in the country. In the working marked (63) on exhibit 73 there are three such minor slips within a distance of about 200 feet, running northwest and southeast as they ought to. There are others on the level too but have indicated the character with which they are very often grouped.

Judge Dickson, I think that I cannot recall any further distinctive features in the vein other and those of the more ancient veins.

Q. I might ask you there, Mr. Finch, I think it is apparent what you have just testified, but I wanted—I want it to appear explicitly—what do you regard what our friends upon the other side have designated as the lower Blue vein, as one of the east and west veins?

A. I regard it as beyond any question in my own mind—that is that part of it which lies east in an east and west direction.

(64) Q. I will you would indicate on plaintiff's exhibit 8, upon the Black Rock vein as lower Blue vein as called by the other side, from its easterly to its westerly end line of the Black Rock claim and state in that connection whether in your opinion what is represented as the plaintiff's exhibit 8 as the lower Blue vein ought to show the lower Blue shaft is, whether that shaft is on what you claim as regard as the Black Rock vein or if it is in another vein or if you have to say about it? If it is more convenient for you to refer to one of the defendant's exhibits instead of plaintiff's exhibit 8 you may do so?

A. I should like to refer to plaintiff's exhibit of the 400 level of the Black Rock, if convenient. Plaintiff's exhibit 11 shows a vein marked in blue which is the Jersey Blue vein as described by the plaintiff's witnesses. It will be observed upon this exhibit that the vein has essentially an east and west direction and is an east and west vein in my mind. It will be observed furthermore that it has a direction converging toward the south side line of the Jersey Blue claim. It has been definitely developed in another point where I can show, showing the two blasted together in the tunnel and certain workings near the surface in the east end of the Jersey Blue claim and in the bottom of Deadwood gulch. It will be observed upon plaintiff's exhibit 64 that the strike of the vein also converges
914 towards the south side line of the Jersey Blue claim and is identical with the strike developed in the 400 foot level of the Black Rock.

Q. What level is that you are referring to?

A. This is a surface map. It represents workings on the surface.

Mr. Dickson: Surface workings and a few workings below the surface?

A. Yes, a few below the surface, a little shaft there, near the gulch, the Dewey tunnel shown upon defendant's exhibit 65 just below the surface, the tunnel in from the gulch and in the bottom of the gulch itself. Now, there is going west from the end of the delineation of the vein on defendant's exhibit 64 a vein running up the hillside which is very easily traced.

Q. Running what course?

A. Running northwest, as it does run up the shaft, the one shown upon plaintiff's exhibit 4, the Jersey Blue shaft, in the region of the gulch. That vein cannot be traced continuously down the hillside because the wash and loose material in the gulch is exceedingly deep, but as we pass down across the south side of the Jersey Blue and inspect the workings which show in the vicinity of the southwest corner of the Black Rock claim, well known drifts, especially one drift for twenty-five feet below the surface known as the McLeod shaft, which should be drawn upon defendant's exhibit 65 ——

Mr. Dickson: We will ask permission to have the name put on, if your Honor please.

915 A. (Continuing:) ——shows a faulting of the Elm Orlu vein by a northwest vein quite distinctly, and a fault fissure of similar character is shown passing through trench "B" and is the same fault fissure, so far as I can see, shown upon plaintiff's exhibit 4. In other words in this area on which the soil is so deep in the vicinity of Deadwood gulch—if the vein is traced through that, it corresponds with the vein which shows in the Jersey Blue shaft. Now, that is a correlation not made from continuous workings but is in a certain sense rather definite because the fissure shown in blue upon plaintiff's exhibit 4 is the only thing of its width in a large area east of the Elm Orlu discovery.

Q. What gulch is that you have reference to, the Deadwood gulch?

A. The Deadwood gulch, yes.
Q. Is it indicated upon defendant's exhibit 64?
A. It is indicated by the stream shaped drawing.
Q. You are referring now to plaintiff's exhibit 4?
A. Yes.
Q. Is it indicated upon defendant's exhibit 64 and if so how?
A. An exactly similar branching, stream-like gulch is shown upon defendant's exhibit 64. This comes down across the Jersey Blue claim, and the fault vein shown upon exhibit 64 geometrically corresponds in position of the wall, and they seem to be exactly of the same character, especially in the 25 foot level from the Mc-
916 Leod shaft. The geology of this level below the vein is not shown exactly upon this exhibit. The exhibit is made up of a compound of that level and another.
Q. You are referring now to defendant's exhibit 65?
A. Yes. The faulting passes through in the region of survey No. 1132. It also shows on the Dewey tunnel, crosscut tunnel, lying between the Black Rock vein and the Elm Orlu vein at its proper position for correlation.
Q. Won't you point out the level with the pointer?
A. The 25 foot level includes survey stations 1104, 1105 and so on to the west to 1151 and then south to 1157; thence easterly on a drift along the south part of the Elm Orlu vein. If you wish me to proceed with a description of the various things in the mine I think I will do it seriatim with these exhibits. Defendant's exhibit 91 will doubtless be referred to usually as the block model. It represents a solid segment of the earth cut out along vertical planes from the surface down to the 1400 foot level of the Black Rock. The surface is a reproduction of defendant's exhibit 64. The base of the model shows the 1400 foot level of the Black Rock, being the deepest working in either mine upon that part of the ore which, as I understand it, is the ore in controversy.
Q. Well, it is the deepest working?
A. On the west end of the Black Rock mine.
Q. You mean the end lines of the Black Rock claim?
A. No, there are other deeper workings in the extreme east
917 end. It is the deepest working west of the Black Rock shaft except short ones down on the 1600. The Block model, besides representing a segment of ground in an area approximately similar horizontally to each of the plan maps of defendant, is cut along certain sections so that the vein as shown at the surface may be followed downward continuously. In that section the ore bodies are continuously developed to the 1400 level of the Black Rock.
Q. Is the scale of the model and the maps the same?
A. It is.
Q. What is it?
A. Forty feet to the inch. The sections are cut along certain planes shown upon all the plan maps, as No. 21, 24, 25, 28, 31, 34.
Q. At what intervals?
A. 200 feet apart west of 25; 300 feet apart east of 25. The outcrop of the vein as shown upon the model—as the Block model is

standing at the present time, this little model, defendant's exhibit 92, is illustrative of the essential facts expressed more elaborately by the Block model. If your honor will look through the top sheet of glass you will see there the delineation of the apex of the Black Rock vein and of the Black Rock-Elm Orlu vein, and its direction through the two end lines of the Black Rock claim, and if you will look through and compare that apex in its direction and form with the ore
918 bodies developed at the bottom of the model, namely the 1400 foot level of the Black Rock, you will see that there is an almost absolute identity of strike and character of structure. The Block model is a means of connecting the apex of the outcrop of the Black Rock vein as shown upon this glass sheet downwards continuously in many places and obviously in all places, with the ore bodies at the bottom of the mine. I will have to stand the model at an angle to your honor's line of vision. As exhibited here you are looking as though we were standing on the southeast corner of the plan exhibits over in the direction of the North Butte mine. The south end of the model which shows no geological representations except at the surface where the Black Rock vein crosses the east end line, is practically the east end line of the claim. There are no considerable workings except at very great depth right at the east end line, but a short distance from the east end line there are great stopes that have great bodies of ore in the Black Rock mine. Section 34 shows upon the plan 34 and indicated upon all the plan maps, and lies at a distance of about 200 feet—a little less than 200 feet from the Black Rock east end line. The stopes upon the vein will be seen in this section to have an almost precisely vertical dip. A black line which shows just to the right as you are looking off to the red delineation of the stopes is the north side line of the Black Rock claim, as you will also observe upon the surface. It is shown upon this section of the model that the dip of the vein at the bot-
919 tom is such that it projects upward to the surface in perfect conformity with the outcrop of the Black Rock vein, which at the surface is developed.

Q. The next section towards the west?

The Court: Do I understand there were no workings upon this?

A. No continuous working, but it is possible, taking some of these descriptions which we have to rely upon by Mr. Clark, who was on the witness stand, and others, for old workings which are not accessible for short distances near the surface, it is possible to go through the stopes of the Black Rock a little further west and trace the continuation of the Black Rock vein to the surface, and then back to its east end line, without departing a very great distance from the east end line of the claim, the continuity being shown with precision in workings following the vein. On section 31 the Black Rock north side line again shows lying to the right and therefore to the north of the ore bodies. At the surface that branch of the vein which runs off into the Niagara begins to appear—section line 31—that branch of the vein which runs off into the Niagara claim begins to appear in cross section in the model. It also is shown upon the model quite clearly, and joins downward in its dip. It is also perfectly clear from the

workings which are now accessible that the great ore bodies developed in the bottom of the mine and having in general, as the section shows, a very slight dip towards the south, do correspond and have been
920 shown to correspond with the stopes and outcrops of the Black Rock vein already described by Mr. Clark who did the mining at that point. There are trenches on the surface of the Black Rock which show upon the model, showing veins and showing wide veins and showing remnants of ore left standing in the walls of the east and west or slightly southeast vein stopes, which lie only a very short distance easterly from section 31, which is now exhibited.

Q. In this section has there been any workings projected to the plane of section, either easterly or westerly?

A. No, I think not. There are certain definite lines—there are certain dotted lines here which represent veins—the correlation of veins found at different points which are obviously the same veins or extensions of veins.

Q. Proceeding to the section of this Block model, had there been any projection upon them?

A. No, the vein is shown only just a few feet above the point where it is seen in the development. It has been projected down slightly on its dip near the top of the model just far enough to have a line long enough so anybody can distinguish its direction on the model, but it is not carried to any great distance.

Q. On section 31——

A. On section 31 it is possible to see something which may appear obscure from a distance, but little segments of the northwest
921 vein which has heretofore been referred to as the Deadwood vein. That shows in the stopes in this particular section running transversely along the vein. It is identifiable up to and between the 1000 and 1100 levels—up to the 1100 level, some distance above. it is distinguishable also in a crosscut running southerly at the 900 level of the Black Rock, being a separate curving and waving line such as is characteristic of veins of the blue vein series at their intersection with veins of the ancient series.

Section 32 takes us on the surface through a drift which has been run—I might state that the delineation of the Black Rock vein on the surface of this model a tunnel which shows upon the section and which will later be exhibited upon the model itself, has followed the Black Rock vein out to its end line.

Q. What tunnel is that, the Mill tunnel?

A. It is called the Mill tunnel, yes, sir. It runs up to the east end line on the vein and it runs westward toward the discovery shaft through the old stopes made by leasors.

Q. That is shown on what exhibit?

A. Shown on Exhibit 66.

By the Court:

Q. Does it cross the Black Rock east end line?

A. It is described in this way; there is an old tunnel over there run by the Niagara starting at the Niagara which was run out there

for the purpose of carrying tailings or something of the sort from the Black Rock mill.

922 Q. The other working that you now speak of running through the model east and west is a drift from that tunnel?

A. Yes, sir; a drift was turned off from that tunnel near the east end line of the Black Rock, and follows continuously on the Black Rock vein. Starting at the east end line where the vein, as is characteristic of it, has branched into several small individual branches, and going westward until it rapidly increases in size and becomes a big ore body, and thence follows westerly along to the discovery shaft. We are now on the Block model on a section which passes almost through the main working shaft of the Black Rock, and which is a short distance west of the discovery shaft or discovery point of the Black Rock.

By Mr. Dickson:

Q. On this section has there been any projection?

A. Nothing but a projection of sufficient distance to get the dip and form of the vein.

Q. To what extent is the maximum projection either easterly or westerly to the plane of section?

A. In the Black Rock vein itself there has been but little projection. For instance between the 500 and 700 of the Black Rock there appears upon this cross section to be some projection for a considerable distance, but the vein is drawn in that interval for the reason that the stope between the 700 and 500 of the Black Rock is not far away towards the east, and the stope which has been made

923 comparatively recently; there are one or two other projections which are made largely for geological reasons; that is, there is a considerable fissure shown associated with the vein followed in the Pyle raise. This is a fissure of considerable magnitude, and being a fault fissure, is something which is bound to cut through the country for a considerable distance, and since in the daylight tunnel near the surface and in the cross cuts which extend all the way across the Elm Orlu claim and a good part of the way across the Black Rock claim there is nothing else that appears to correspond to that particular fault fissure that dotted line has been drawn between the two points.

Q. And where the lines are represented on that section in full, it is intended to indicate *that* the works that are cut there by the plane of section?

A. Yes, sir.

Q. Where there has been any projection it is in broken lines or dotted?

A. It is in broken lines, to indicate either conjecture or probabilty, and in any case they need a certain amount of exploration to explain what they are.

Q. Go ahead and wherever you think it is necessary, expain it; it will take no longer now than on cross-examination.

A. Well, in this particular section I think that that rather con-

siderable fissure which has been dotted all the way from the Daylight tunnel to the 450 level of the Black Rock is the only thing which requires particular explanation; there may be some conjecture in that; I think there is. It is only the lack of anything
924 else to correlate that with.

Q. Well, in this and all other sections of the Block model, I will ask you where the workings are cut by the plane of section they are shown?

A. They are all indicated or intended to be.

Q. You believe them to be?

A. Yes; they are shown with solid outlines wherever they are absolutely cut by the section or where they are a few feet away, and where for the sake of illustration they are projected into the section the workings themselves are shown in dotted outline, as are the geological facts.

By the Court:

Q. That fissure that you have projected up approaching the surface just south of the Daylight tunnel, do I understand you that that is what is called by the plaintiff the Pyle strand, or a fissure that cuts it off about the 400?

A. Well, I don't know that I can explain the plaintiff's testimony, because they do not seem to agree in their description of that, but I can give you my own conclusions about it.

Mr. Dickson: We will take that up as a separate matter, if your honor please.

By Mr. Dickson:

Q. Point out to the court where the Pyle raise is cut by this place of section?

925 A. The Pyle raise is approximately along the plane of section all the way from the bottom up.

Q. At what level?

A. Near the 1100 foot level—indeed a little below the 1100, including an old raise which has existed for a considerable length of time—as a matter of fact from the 1200 stopes of the Black Rock upward to the 450 level of the Black Rock it is almost on this line of section. Above that point the Pyle raise is moved off a very considerable distance toward the west and does not appear.

Q. We will take that up separately, the Pyle branch.

A. Yes, sir.

Q. Very well, proceed.

A. There is shown upon the model on this section, as upon the map at the point where there are several cross cuts which extend out some distance away from the veins, and which in all cases find little seams of quartz and sometimes little slips which are shown in blue; on the 450 of the Black Rock for instance there is a great series of them, some 11 or 12. The ones which are represented in red are quartz and manganese, and are seams in the granite which may have

some continuity and which may not. Developments in certain places indicate that seams of that character do not have great continuity.

Q. And those in blue?

A. Those in blue, some of them, especially the more con-

926 spicuous ones which have been followed up along the Pyle raise, is one of some continuity.

Q. The blue is intended to represent faults or slips, either one?

A. Yes, and where there is any mineralization of the fault or slips there is red accompanying the blue. The Clark tunnel is shown. That involves a certain amount of projection of the workings. The section passes through line 28 on the plan map. The Daylight tunnel, as shown here, enters the model just to the north of the cross section under discussion. The Clark tunnel enters the hillside to the east of the section, and the Daylight tunnel to the east also, on an average of about 50 feet or thereabouts away, although extending them out they are about 100 feet, and there is that much projection of the tunnels. At a certain point 60 feet or so south of the south side line of the Black Rock there is a drift or cross cut which runs northwesterly into other workings from the Clark shaft; that is really a part however of the Clark tunnel or workings. Those are also projected upon this cross section. The Clark shaft is indicated here. The workings in the tunnel and from the Clark shaft constitute a continuous cross cut through the Elm Orlu claim. Several little red seams which are shown upon this cross section that are disclosed in the Clark tunnel and other places in here are near enough at hand so there will be no uncertainty about their position on this cross section.

927 Section 25 is a section which stands between the two mines, and to a large extent is an undeveloped section, the Elm Orlu mine not extending quite far enough east in most cases and the Black Rock mine not extending quite far enough west, and there are workings near enough to section 25 to justify in my mind the representations which have been made by dotted lines of the vein. The Elm Orlu-Black Rock vein which comes over from the Elm Orlu claim into the Black Rock and crosses its south side line is shown upon this section at a distance of about 60 feet north of the Black Rock south side line. The Black Rock vein itself is shown about 190 feet north, that is, to the middle of it. This section, in other words, is not far west of the junction of the two veins, and if the apex as shown upon the surface of the model be studied that fact will appear. There are certain levels, such as the 800 foot level of the Elm Orlu and the 700 of the Black Rock and the 1000 foot level of the Black Rock, parts of the Pyle raise, the 500 of the Elm Orlu, which disclose certain facts which are represented upon this cross section, and there is sufficient development of the Black Rock Elm Orlu and the Black Rock vein near at hand so that they have been placed upon the model.

I will now return for a moment to Section 31 and also will refer to Section 28. It will be observed that the block model not only represents certain vertical sections, but certain important workings

showing the continuity of the veins near the surface are
928 shown upon the planes upon which the model splits horizontally. I have in my hand now the top layer of the block lying between section- 28 and 31. It shows the easterly end of the tunnel known as the daylight tunnel, which is really another entrance to the Black Rock tunnel, both being on the same level. The daylight tunnel enters the surface and develops a broad vein, starting with the north and southerly dipping Niagara part of the vein and extending clear through to the discovery shaft of the Black Rock. I should like to ask Mr. Murphy, who is here in the room, to place upon the surface of this segment which I have in my hand the discovery shaft as shown upon the surface map. It is only a matter of putting it on in pencil and can be done now. Beyond the discovery shaft in the daylight tunnel is a cross cut extending southerly. There is shown in it two or three little branch veinlets of the lode. Slightly east of the daylight tunnel is the mouth of the Clark tunnel which lies between sections 28 and 31. The first thing the Clark tunnel develops is the Deadwood vein. The Clark tunnel enters the surface at the point I indicate now, the Clark tunnel on the plan map, and here upon the surface of the model. The first thing it develops is the Deadwood vein, and south of the Deadwood vein a little scattered mineralization in the country, and then two or three slips, and finally a little fissure which is correlated upon Section 28 as possibly the fissure which represents the Pyle vein near the surface. Nothing of any consequence is further devel-
929 oped toward the south end of the Clark tunnel, and the workings from the Clark shaft. The lower surface, the scale being about 40 feet to the inch—the lower surface which I now display is about 80 feet deeper. The development upon that was started, as far as this raise is concerned, by sinking a winze downward from the discovery shaft on the discovery vein to the level of the Niagara tunnel, which *which* shows upon this second plane or surface, between Sections 28 and 31. Certain things were shown upon the old map of the Niagara tunnel. Part of the tunnel was accessible. Stopes were seen running off, and a series of them, as will be shown upon this surface, running easterly almost precisely parallel with the north side line of the Black Rock, and lying at a distance of from 40 feet to 150 feet south of the north side line of the Black Rock, and at no great distance, therefore, from the surface. That winze which entered the Niagara tunnel, continuously upon vein matter and through old stope workings below the discovery shaft—it broke in at the point I now indicate. There is no mark upon the surface map or the model or upon the plan map or upon Exhibit 66. I will now mark the letters "DW," being the initials of discovery winze, and the same letters upon the surface of the model.

Q. You have made a corresponding mark on the block model?

A. Yes, sir.

Q. That winze went down from where?

930 A. It went down from the daylight tunnel, which was really driven out to the surface from the Black Rock tunnel

level after the Black Rock tunnel had reached this point to the east, the point that the patent designated as the discovery of the claim; that point was located, and then a cross cut was driven, and the cross cut was driven out to daylight. A vein was found in the cross cut tunnel, and above the tunnel an opening was made, including the discovery point called for in the patent. In that excavation it has been found that there are old workings, and as far as I can tell a stope rather than a discovery shaft, from which the discovery vein has apparently been excavated. Then this opening was made up to the surface, and up along this old stope working filled with refuse and material from the walls. This working was carried down by means of the winze that is indicated here from the daylight tunnel. We will just mark that "W," upon the surface; that shows the daylight tunnel, the old stopes, clearly old stopes, showing old stope timbers crushed, and vein material on the wall, and that was reopened downward in the winze to the next surface, which I am now exhibiting upon the model, and eastward from that winze a drift was driven along the edge of the old working for a distance of 70 or 80 feet, showing some of the vein matter still left there, but driven along the edge of it because it was easier to keep it open by doing it in that way.

931 By Mr. Gray:

Q. This discovery that you have located there, is that located according to the patent?

A. The point is located by the patent, and we found at that point a hole which was apparently a stope.

Then *striking* eastward in the reopening of the old Niagara tunnel, at a distance of about 90 feet from the discovery winze, an old cross cut was found. This cross cut was in part reopened from a drift which had also been carried along the northerly side of the broad discovery vein.

By Mr. Dickson:

Q. Is that an old working also?

A. Yes, an old working which was reopened. The working which I last referred to includes the survey point No. 944. That also was an old stope, and the old stope chutes are now standing there, crushed somewhat but recognizable. At a distance of 90 feet from the discovery winze the cross cut was reopened, showing a width of about 35 feet or more of vein matter between the two drifts which have been described. Easterly from that point the vein was followed along its south wall in the workings shown upon Exhibit 66 and Section line 31; that is about the section line 31. There the edge of the vein which was followed in the old workings shows at that point, either a fault, a small one, in the face, or something which I will have occasion to describe later on, which is gen-

932 erally known in the Butte district as a horsetail vein, swinging off from the main body of quartz.

Q. What is the course of that fault or horsetail vein?

A. Southeasterly over into the Black Rock claim. A short cross cut was driven north from this horsetail or fault, whichever it may be, from the region of cross section 31 to a very solid massive body of quartz, and a body of quartz that is unmistakably a continuation of the big body of vein matter and ore and quartz which I have described as 35 or more feet wide west of that point. The drift is driven then along some distance beyond section line 31, old workings being shown. A drift was also driven southerly on this, and from one where the cross cut is made more or less parallel with the drift last described. It lies southerly of the drift which I have described and is along the main part of the vein, the ore bearing part of the vein, and extends for about 40 or 50 feet in a northeasterly direction until it picks up the wall of the same main ore body. At a station marked 1047 which shows upon the segment of the model lying between sections 31 and 34, old stopes are again encountered upon the same quartz body. Those are the stopes which have been described by Mr. Clark recently on the witness stand, and the timbers of an old shaft—apparently the timbers of an old shaft are found as indicated upon Exhibit 66 near station 1118. At this point the vein in going eastward—that particular part of the vein be-
933 comes considerably smaller and appears to exist in two branches, one branch coming over from the Niagara part of the vein and easily correlated with one or the other of several similar branches which extend to the eastward and southeastward from the large quartz body in the Niagara—this being a habit of the vein, not only at this level but in every other level of the mine.

Q. What being the habit?

A. An arrangement of transverse minor veinlets or veins between the combining fissure veins on the north and south sides of the larger lode. Passing eastward from that point a distance of 40 or 50 feet, a similar horse tail or transverse veinlet or branch extends out of the drift, and a drift has been driven for a considerable distance on it since this map was prepared.

Q. Extending southeasterly also?

A. Yes, sir, and it is marked "Ag. ore" upon the surface of the model, meaning that it is silver ore at that point.

Q. Does that show on the map; you say it has been driven since the model was made?

A. It was driven out from station 1111 on the map. The drift was continued easterly upon one of the series of several branches or strands, as the term has been used, in this sort of stockwork characteristic of the vein, to the east end line of the claim. It was driven continuously upon one of these, and several others are in-
934 cidentally developed. A short distance west of the east end line of the Black Rock claim a cross cut was driven to show these several things, in order that elaborate drifting upon them could be avoided, and between the extreme branches shown by the cross cut a very considerable amount of intertwining stock work of quartz and other vein matter is disclosed between the more defined east and west fissures in the cross cut.

Q. What is the width of it there; how much has been cut in the cross cut?

A. That allowed granite and stockwork has a width of about 25 feet, and outside of that there are still other branches of the vein which extend individually, on through the granite.

Q. How far is that cross cut from the east end line of the Black Rock?

A. It would be an average distance of about 40 feet. Now, I might say in that connection that immediately above this cross cut is a part of the mill building built by the Butte & Superior Company, and in the course of the construction of that building and a certain time when I was here personally there have been cross-cuts which have shown this series of fissures at the surface itself, and at the end line itself. However, at a point under the second floor of the mill building, a new tunnel has been driven within the last year, which is indicated upon the mill tunnel surface of the black model as the tailing tunnel. That was not opened for a great length of time, but I happened to be here when it was open, and near the house of that and at a distance of about 120 feet south of the north side line of the Black Rock claim is a vein which belongs to the Black Rock vein as one of its easterly branches, and which is moreover shown in several branches on the surface, but as developed in the mill tunnel level. It is shown at the two places which I now indicate on the surface, in a trench lying about midway between section 31 and 34, toward the southerly end of the trench, and is shown upon another trench shown upon Exhibit 64 a short distance to the east of Section 31. Now, I might say, if it is proper to do so, in connection with this explanation, that the course of the Black Rock vein toward the east end line of the claim and downward throughout the Black Rock mine and in the vicinity of the Black Rock east end line, the ore bodies continually terminate. The vein goes on as a non-commercial vein, and it goes on, instead of a comparatively solid vein containing great masses of ore, as a vein which is separated into more or less individual vein fissures, connected by a stock work of smaller veinlets and seams, exactly as shown upon its surface and in the mill tunnel described.

Now, starting again on section 9 the Niagara tunnel and the mill tunnel having been described up to this plane of section and its entrance to the Clark tunnel and the Daylight tunnel having been so described, the segment of the model which I have now removed shows the outcrop or apparent outcrop of the veins underneath the surface and buildings, and that sort of thing, but projected enough on this model in order that its position might be shown, it of course being obvious that it could not occur in the dump or foundation of these buildings, but at a short distance below the actual surface of the model. The Daylight tunnel which is a part of the Black Rock tunnel, enters a short distance east of the block. Immediately west of this will be seen that there is an extensive, complicated arrangement of veins and post-mineral faults. The large, solid quartz mass which was followed in the Niagara tunnel across into the Black Rock is developed in these workings over a

[illegible] of about one hundred feet west of the plane of section BB, also a large mass of quartz which has been described as the Bastion reef and which I shall call the Black Rock Elm (Blk) vein. There is also the Lower Elm vein shown by the small working at the north, mainly upon the upper plane of the model, along the Black Rock level. There is also shown the fore bunches, which I think are readily recognizable as the Deadwood vein required by disturbances and dislocations which occurred along what has been called the Black Rock fault. It has cut out to branches along the old and pre-existing structure, sending a branch across country transversely to the rock structure and vein structure and everything, over the hanging wall of the Lower Elm, and in other branch along the Black Rock Elm (Blk) vein. The condition of things is [illegible] which has been extended to the Daylight tunnel. There are a many individual features of development at that point that a single drift could not do it, not a single crosscut. Consequently quite a network of workings has been made in that region. Upon the surface of the model as established, being the Daylight, Black Rock tunnel level, there will be found besides the Black Rock vein and the Black Rock Elm (Blk) vein the various branching strands or separate individualized veins of the Black Rock [illegible] merging into the Elm (Blk) and faulted more—or more [illegible] but by the Deadwood fault which is also a vein. The segments, however, are easily recognizable through that area of faulting and are found in actual junction, an actual coalition with the vein matter of the Black Rock Elm (Blk) at a number of points. The little area of which section shows upon the map and the area upon the model, is the area in which the Black Rock vein has its prevailing mineralization into the granite, and it has other points where the solid part of it has been developed down in the mine. The mineral vein is represented upon the model in red. The little dislocated segments of the northerly wall or limit of the Black Rock vein is shown as I can indicate it, being the northerly border of the vein and vein mineralization. The point of junction of the vein and vein [illegible] quartz body with the light—with the large quartz body in the vein are shown at several points on this drawing. The imagination has to be used here a little in reconstructing the Big Black Rock Elm (Blk) joined vein back to its original position before it was faulted by the Deadwood and the Black Rock. The [illegible] which goes on towards the east and its segment which goes on towards the southeast of the Elm (Blk)—a dislocation of the two. Some where they have fractured back on the foot of the wall. The [illegible] of the dislocations of the systems of vein material [illegible] have happened when they were formed. There then was an additional disturbance happened in that region which is of no particular consequence except that it has come on individual level of quartz or vein material to be cracked up in certain places, and that is the dislocation that is merely artificial and is the result of mining in that vicinity. There has been a great deal of drifting around the Black Rock shaft, enough

to disturb the shaft very materially for mining operations; there has been a settling into these old stopes made years ago and that has also cracked up certain of the quartz bodies and destroyed their perfect regularity, but nevertheless not enough to destroy the continuity of the mineralized zone.

This same surface of the Black Rock model will show a large part of the workings made originally from the Clark shaft and
939 before the Clark tunnel was driven. Those extend all the way across the Elm Orlu claim. They have a prevailing northwest-southeast direction but are only seams of clay or minute seams of quartz and barren vein material, in country rock. Their direction and form expresses nothing more, however, than the direction of the prevailing strike in the country rock, as a whole.

Mr. Gray: Which ones are those?

A. They are indicated by blue and red, according to whether they are clay or barren vein material.

Mr. Gray: If they are red and blue together, I presume it represents both?

A. Yes. Section 25 has already been described as being the section intervening more or less between the two mines. In these sections 25 and 23 still farther west, it will be seen that the two veins, Black Rock and the Elm Orlu, are well separated; that is, between them there are these customary little seams of barren quartz and little seams of clay produced by the Black Rock fault fissure. The section 23, which lies on the other or west side of this block, is now displayed. It will be observed that on the floor of the model, which represents the 1400 foot level, as well as upon the top of the model which I have just explained to your honor, that there is this same distance, approximately, between the Black Rock vein and the Elm Orlu vein—Elm Orlu-Black Rock vein. This cross section, and all
940 of the cross sections, illustrates one thing it seems to me, in a striking way; that there are many lines of mineralization extending down through this granite which conform quite precisely in their dip, they both curve in about the same way, starting with a marked northerly dip, turning more vertical as they approach the 1400 foot level of the Black Rock. This cross section shows in addition the customary structure in the veins of this nature. Passing downward in the workings of the Elm Orlu, which are mostly on the left or southerly end of the section, it will be seen how many strands or downward branches there are in it, all more or less related, with the strike well mineralized. It will be seen extending from the Black Rock vein there are also——

Mr. Dickson: What level, about what level?

A. About the 1100 of the Elm Orlu, 1000 of the Black Rock, and at other points further down—there are little branches indicated definitely here in red lines, shown branching away from the Black Rock and down to the branches of the Elm Orlu. There is also shown in a striking way upon this cross section the identity of age of these two veins that are beginning to approach each other upon their strikes and the intervening wedge of ground which has been considerably larger towards the west is now lessening, and there are

branches of each which extend out toward the other and connect in between the other. There is one branch in particular which is a rather definite branch, extending downward from the 1200
941 foot level of the Elm Orlu to the 1300 foot level of the Black Rock, and is the thing which has been shown upon this cross section and other exhibits as the Rainbow lode itself. This cross section however illustrates the fact that there is a Black Rock-Elm Orlu vein in rather definite fissure form, very well mineralized and containing large bodies of commercial ore as developed at a distance about 100 feet west of this particular section, a vein which pursues its own direction into the earth and extending out and spreading mineralization towards the Black Rock vein to the north as the Black Rock vein sends out its spreading mineralization towards the Elm Orlu vein to the south. The two things are individual, and yet they both, as we get deeper in the earth, increase their mineralization until they are interlocked by the overlapping of the mineralization.

Q. The ore mingling from one to the other?

A. Yes. The surface is removable again down to the level of workings which have been made to show the continuity and the apparent apex of the Black Rock vein, namely, a continuation of the Black Rock tunnel.

Q. Mr. Finch, if it will not disturb you—you have spoken on section 23 of this Elm Orlu vein, or Black Rock-Elm Orlu vein, extending in its own direction down almost vertically beyond the point where you have the ore, following out continuously from that vein to what they call the Jersey Blue vein and what we call the Black Rock vein?

942 A. Yes.

Q. Will you point to the model, plaintiff's model, and indicate to the court where that branch is shown on the model extending to a point below the base of this. Describe the character of ore that is in that vein?

A. The two models are approximately in orienation now. Section 23, which I have been describing, lies just a little to the east of the workings here shown in red.

Q. How far east of it.

A. About one hundred feet. And the working to which Judge Dickson has directed attention, which has been made between the 1500 level of the Elm Orlu upward to the 1400 of the Black Rock and thence to the 1200 of the Black Rock and from the 1200 of the Black Rock up into the 1300 of the Elm Orlu, whence on upwards towards the surface, there are continuous developments upon the Elm Orlu vein, as named by me, up to the 800 foot level and then to the surface.

Q. Describe the raise, the dimensions of the ore encountered at the foot of this raise you have just been speaking of, the 1500 of the Elm Orlu up to the 1200 foot level of the Black Rock, and its position as to verticality?

A. The raise mentioned starts at the 1500 Elm Orlu. The Elm Orlu vein is wider than the raise.

Q. And how wide is the raise?

A. The raise is—the part of the raise which I could see is
943 one set wide. I think that is its whole width.

Q. That would be how wide, six feet?

A. About seven feet, as the ground would break.

Q. Go on?

A. That raise by the way has been named the Bruce raise.

Q. The Bruce?

A. Yes. It shows upon the various plan maps by that name, for instance on exhibit 81, the bottom of it is shown, the upward vein at that point.

Q. That branch of it?

A. Yes, that is the main Black Rock-Elm Orlu fissure—is at that point about twenty-five or thirty feet wide; it is in commercial ore I think; at any rate it looks like it.

Q. Zinc ore or what?

A. Zinc ore. Three or four sets higher up, above the 1500 foot level it becomes ore which is unmistakably commercial ore because it begins to be practically solid zinc which follows vertically upward along the raise to the 1400 of the Elm Orlu. The raise is vertical. The vein is not exactly vertical, but notwithstanding the fact that the ore crosses it somewhat diagonally the raise is able to go up in a vertical direction and lays in solid ore all the way.

Q. So are we to conclude from that that the vein is practically vertical?

A. Yes, a slightly southerly dip, as it has from the sur-
944 face. The raise comes up vertically from the 1500 to the 1400 of the Elm Orlu and the position of it is shown upon defendant's exhibit 79, also named the Bruce raise. There are, however, two raises here, one coming up from the 1500 to the 1400, the other from the 1400 to the 1200 Black Rock. The northern one is in solid zinc ore. A cross-cut is driven over to the foot of the other, where it goes up to the 1200 Black Rock and also is in ore.

Q. What is the distance from the top of one raise to the bottom of the other?

A. About thirty feet. There is a little waste material as usual within the vein, but it is one of the best displays of ore in the two mines. There is more vein beyond the measurements which I have just given, beyond the south side line of the raise coming up and the north side of the raise going up are still in ore. The raise has one offset in it from the 1400 Elm Orlu up to the 1200 Black Rock and that offset is shown on the model, plaintiff's model. It comes up to the 1200 Black Rock in the midst of a wide vein which shows from the 1202 cross-cut and a cross-cut in the drift from the top of the raise through ore, over to the old cross-cut of the 1200 level of the Black Rock, coming out about twenty-five feet west of survey station 28.

Q. Point it out on exhibit 78?

(Witness indicates.)

945 Q. And the raise is there again marked "Bruce raise"?

A. Yes. In passing backward, it might be of interest to state that in another cross-cut extending northward from survey station 399 an old cross-cut, an upper raise has been driven upon the same old level, upward to the 1300 foot level of the Elm Orlu. It is marked "East Bruce raise" upon exhibit 78. Section 21 lies 200 feet farther west, therefore about the same distance away from the raise which has just been described. The Elm Orlu vein, concerning which we have just been talking, shows in various levels of the Elm Orlu mine, and the structure downward is more or less of a fissure form, as it shows along the raise which has just been described.

It is developed on the 1500 of the Elm Orlu near this line of section, the raise named the Bruce raise being the only development—that is the Elm Orlu Company never have made a connection on this vein which we call the Black Rock-Elm Orlu vein. The Butte & Superior Company has made it in the Bruce raise, and the appearance and nature of the vein as disclosed by the raise is represented upon this cross section, so far as that part of it is concerned, lying south of the post-mineral Black Rock fault. The part of the vein lying south has developments in the plane of section, various cross-cuts. It shows in section 21, without going into too much reiteration, precisely the condition shown also in section 23

946 with more or less definite fissuring followed by prominent pre-mineral gouges downward from the Elm Orlu towards the Black Rock, called the Rainbow lode by the plaintiff—it shows downward from the Black Rock vein similar branchings, more or less definite fissures formed along the vein, one known as the Creden vein, which is also a vein of commercial value in this particular line of section. It shows also downward continuously the north wall of the Black Rock vein, a wall which in a raise driven in section 23 could be followed through the Black Rock tunnel, where the raise was in condition to do so, from the Black Rock tunnel continuously downward into the north wall of the stope on the 1400 foot level of the Black Rock without any interruption of any kind except an occasional post-mineral gouge, which in itself is not an interruption. On section 21 I might make some mention of a vein which does not show on the other section. It has not been connected up through unknown spaces in this section because it is a separate vein from anything to be considered in connection with the Black Rock and Black Rock-Elm Orlu vein. It is a northwest vein which has been referred to as the copper vein by the plaintiff's witnesses. As I recall it this section in approximately this same position does not show it at all. It has to me this interest—if it is not too much of a digression—it is a vein with which I am somewhat familiar at other points and is a rather typical northwest vein. It comes in

947 indefinite fissure form from workings lying just to the south of the Elm Orlu south side line.

Q. Are you referring to an exhibit?

A. Yes, exhibit 78.

Q. And to the line of work marked "copper vein?"

A. Yes. It is a productive copper vein. It is a definite copper vein up to the point where it meets the south wall of the Black Rock-Elm Orlu vein. Beyond that point *is it* not a definite vein at all. The northwest veins customarily have their greatest productive importance in the region lying southeast of this area. There is where they are at their best.

Q. That is northwest-southeast veins?

A. Yes. And I am saying that in connection with certain statements which have been made concerning a so-called segment of the Black Rock vein across the Elm Orlu vein.

Q. I prefer that we take that up as a separate subject. Isn't there another section there?

A. There is another section there, but there is no geology on it. Section 19 has been made in the model but it has not been completed because it extends beyond the developments made upon the Black Rock vein and it would throw very little light on the subject as far as my testimony would go. It shows the apexes of the veins.

Q. In view of that fact, you may proceed where I interrupted you, where you were speaking of the northwest-southeast veins
948 being more productive in the southeasterly portion?

A. Yes. It is only a matter of comparison in my own mind. I don't know whether it is proper to state or not, but knowing as I do the nature of these northwest veins as they extend southeasterly into the adjoining ground, I should expect the so-called south segment of what has been called the Jersey Blue vein to be at its best southeast of the Black Rock fault. It has been one of the considerations which led me to believe that no such southeast segment existed at all. That is all I have to say on that subject.

Q. That is with reference to the Black Rock vein you say?

A. With reference to any southeast segment lying south of the Black Rock fault, any southeast segment that would correspond with what I am attempting to describe as the Black Rock vein. Excepting for the developments which are made in the Dewey tunnel to the west of section 21, which are shown under a removable block, lying between sections 19 and 21, the model has been nearly all described. The developments shown in the Dewey tunnel illustrate what I have referred to once before as the indefinite spreading south wall of the Black Rock vein. The Dewey tunnel also shows the Black Rock-Elm Orlu vein where it is intersected and on the same tunnel shows precisely the same condition of an indefinite south wall.

949 Q. There are little veinlets running out of the south wall of one and the north of the other?

A. South wall of both. There is a certain mechanical reason for that, if it be of any interest, and it is a very simple one. Represent the ground—represent the surface of the ground as it exists at any time up to the formation of the Black Rock-Elm Orlu veins. The veins of this type in these mines do dip southerly; they do all over all the district dip southerly; they do all over the district have definite north walls and indefinite south walls. In the Leonard mine,

for instance, the south wall can't be fixed at all. A fissure which dips southerly, a fissure which cracks the granite rather than forming by some great disturbance which will form a clean cut fault, a fissure which allows the stresses to accumulate and to operate without forming a gouge which will enable the rock to slip, it has the effect of sending up cracks into the overlying mass of rock which is in movement. The underlying rock in a case of that kind is sustained by all the rock to the center of the earth. The overlying mass can give way, because it has nothing but the atmosphere above it; consequently there form in this overlying mass many great cracks running in all conceivable directions, and it is in such locations that the stock works form. And the north boundary of these ancient veins is therefore a clean cut boundary, and the south boundary is an indefinite one, into which the mineralization spreads out from the fissure.

950 Q. And that is characteristic in various places of both of these veins?

A. It is. Moreover, in a fissure which does not have gouges so that the rocks on the opposite sides of it move easily upon each other, a fissure upon which the rocks more or less adhere to each other, the structure which already exists in the rock, which may be represented very roughly by the structure which exists in the leaves of a book, give to a little motion, and it will be found that those leaves spread themselves as they drag along the surface. The leaves in the structure of the granite, as these fissures have come down, in a great many places they are found to have spread themselves outward from the south wall of the ore bodies precisely as the leaves of the book do if they are dragged along the surface.

Q. You might refer to any of the other exhibits that you desire, to illustrate your testimony?

A. The surface of the model extending west, to complete the description, is a reproduction of the apex map.

Q. It has been testified by the expert witnesses for the plaintiff companies that the Black Rock vein, the Jersey Blue vein as it is called by them, in its downward course intersects and cuts through and passes beyond the Rainbow lode, so called, and that that is made apparent by developments on the 1700 foot level of the Elm Orlu.

Do you know the developments there referred to?

951 A. Yes, sir.

Q. Before asking you as to that, I will ask you if you have reached a conclusion as to whether or not there is any such intersection of the Rainbow lode by the Jersey Blue lode, and also whether you have reached any opinion as to whether the Jersey Blue vein, which we call the Black Rock vein, in its course downward anywhere forms a union with either branch of the so-called Rainbow vein?

A. I have reached a conclusion, yes, sir.

Q. Well, answer the latter question first; what conclusion have you reached as to whether the Jersey Blue vein, so-called, forms a union in its downward course with a branch of the Rainbow lode so-called, and about where that union is, the uppermost level where it is found,

and all the reasons you can give for that conclusion, and whether from the uppermost point of union it continues down as one vein?

A. The Jersey Blue vein, as far as it coincides with the Black Rock vein in the west end of the Black Rock claim as I have described it, does not cross the Black Rock-Elm Orlu vein or any vein. It is a vein that is the oldest mineral deposit in that region, and is thereby crossed by everything in the nature of a disturbance subsequent to that time. It is crossed by the Black Rock—I mean by the Deadwood fault, as already described at the Black Rock tunnel level in the vicinity of the Black Rock operating shaft, as is also the Black Rock-Elm Orlu vein. The effect of its being crossed
952 by a vein of later age indicates at least that both the Black Rock and the Black Rock-Elm Orlu veins are older than that vein. It is generally considered, and I think has already been stated here, that the next series of veins in age is the Blue fault vein series. That being the case, it is quite strongly indicated that the Black Rock and the Black Rock-Elm Orlu veins are veins of the same age, there being no intervening systems of veins. Aside from that, there are points at which the mineral, the ore of the two veins is found to coalesce, to merge into one single body. On the map here shown, Defendant's Exhibit 78, there is a large Black Rock-Elm Orlu vein, showing its structure in a northeasterly direction, with the banding and layers of the ore running in that direction. There is also a Black Rock vein; there is between them an intervening area of branch veins which show upon that cross section better than upon the plan map, for in-tance the Creden vein, which I now indicate, under the letters "Black Rock."

Q. You can show those sections on the block model?

A. Section 21 shows what I am referring to sufficiently. The Creden vein which should be marked upon this cross section—may I ask the draftsman to put it on in pencil right now—is shown extending from the 1300 foot level Elm Orlu up to the thousand foot
953 level of the Elm Orlu not far from this section, and developed continuously by a raise to a point where it becomes a part of the main Black Rock vein.

Q. Unites with it in its upward course?

A. Yes, sir. Downwards it becomes completely and just as clearly a part of the branch from the Elm Orlu vein which extends between the Elm Orlu and the Black Rock. I am asking that the main Creden vein be placed upon the cross section. Besides the more or less defined branches, the exhibit which I am now discussing, Exhibit 78, contains traversing between the several branches, an interlacing series of seams of ore—not of mere vein matter or quartz, but zinc ore, extending in a general southeasterly direction, across and between them, but in some instances extending north and south. This is the 1200 foot level of the Black Rock. Those defined little veinlets are each of them individual branches of the main fissure. On the 1300 foot level of the Elm Orlu, just above, shown in Exhibit 77, these interlacing seams have made out of the granite a mineralized area in which the deposition of zinc has been so

extensive that the whole area is stoped. Starting from the Black Rock vein at the extreme end——

Q. You mean the whole area between the two branches?

A. Yes. Starting from the Black Rock vein at the extreme end of all the development where the vein or branch which has been referred to as the Creden vein unites with the Black Rock at
954 the westerly end of 1320 drift, we have what is a typical case developed of the minor structures which near the region of junction extends between the two. It merges out and extends out continuously with the same mineralization, as a branch extends out from a tree, from the Black Rock vein, southeasterly to this intervening branch of the Elm Orlu vein, and finally some branches, a great many of them extend across to the Elm Orlu itself. In the cross-cut No. 1307, which extends approximately along section 23, there are similar southeasterly strands originating in the body of the Black Rock vein and uniting with the body of the Elm Orlu vein, every one of which is a proof of the contemporaneous formation of the ore in it.

Q. Mr. Finch, the question you were proceeding to answer at the time of the adjournment last night was sort of a double barreled question; that is there were two questions in the one, and I will separate them and have you take them up separately in your answer. First, I will ask you whether or not you have reached the conclusion as to whether the Black Rock vein, in its downward course, anywhere unites with a northern dipping branch of the so-called Rainbow lode and then continues downward with it as one vein or a merger of the two?

A. It does.

Q. Have you reached that conclusion?

A. Yes.

Q. Will you point out or state, using the sections where
955 necessary, all of the reasons you have for that conclusion; what observations you have made that direct or lead you to that conclusion?

A. Section 21 is now exhibited in the block model. It will be observed on cross section that in passing downward from the surface on the Black Rock vein it pursues a perfectly regular dip—first, with a slight dip towards the south and finally down toward the 1300 and 1400 levels of the Elm Orlu and the 1500 Elm Orlu and the 1400 Black Rock, it shows a very slight dip towards the north. The wall of that vein as developed in a continuous raise from the Black Rock tunnel near the surface to the 1300 foot level of the Black Rock near the bottom of the section can be traced continuously and into coalition with and union with the wall which goes down from a depth half way from the Elm Orlu 1400 and the Elm Orlu 1500 on this plane of section and thence down in the large body of ore which has been called upon plaintiff's exhibits the Rainbow lode and which we call merely the downward continuation of the Black Rock vein. The elevation of joining of the northerly and possibly the principal fissure or individual vein of the Black Rock with the northerly dipping branch extending downward from the

Elm Orlu is somewhere about the 1200 Black Rock in this particular plane of section. The height at which that union takes place is slightly different in different sections, moving or sloping
956 upward as you pass towards the east, and sloping downward as you pass towards the west.

Besides the main ore bearing part of the Black Rock vein there is another branch which has been called the Creden vein, and should be so named on this cross section. That is shown in the 1000 foot level of the Elm Orlu in the immediate vicinity of this cross section, united, branching away from and spreading out downward from the main Black Rock vein. A working which has been referred to as a stope has been made for a distance of about 40 feet above the 1000 foot level of the Elm Orlu, or nearer 50 feet. In a certain sense it is a stope, but it is a stope which crosscuts from the extreme north wall of the Black Rock vein southward through all of the Creden vein and through the vein material which unites them into one. Passing downward below this point the Creden vein is developed near the line of Section 21 by a continuous raise, downward to its own individual junction with the ore bodies of the Elm Orlu at the 1300 foot level.

Q. The same north dipping branch of the Elm Orlu?

A. The north dipping branch of the Elm Orlu, which goes across on a flat dip from the Elm Orlu vein to the Black Rock vein. The dip of the north dipping ore body, by the way, is something like only 30 or 40 degrees.

Q. When you say the north dipping ore body, do you refer
957 to the north dipping branch of the Elm Orlu?

A. Yes, to the north dipping branch of the Elm Orlu at the point where the Creden vein joins it in this section, where the dip is about 30 or 40 degrees to the north on top of it. We are all prone, I suspect, to regard that as a north dipping branch largely because the developments upon it are close to its north or upper wall; as a matter of fact the spreading mineralization and zinc ore which lies under its hanging wall has either a horizontal or possibly a slightly south dipping form, so that it is as a matter of fact a spreading of the mineralization in the form of a link which on the average is approximately horizontal between the Black Rock and the Elm Orlu.

Q. Right there will you bring down the 1400?

A. The 1400 shows on the bottom of the model.

Q. Well, I want to see the other. What is the distance on the 1400 foot level between the Black Rock vein and the Elm Orlu-Black Rock vein?

A. About 350 feet on the line of the section, growing less as you pass east.

Q. There is no cross-cut between the two on this level?

A. No, not on the 1400 foot level.

Q. All right, proceed.

A. I would like to see Plaintiff's Cross Section 7, which is numbered Plaintiff's exhibit 32. This cross section passes through

958 approximately the same north and south plane, and shows the Creden vein and the Black Rock vein down to the 1300 foot level of the Black Rock in about the same way in all the essential details as section 21 of the model, with the exception that the Black Rock vein or Jersey Blue vein is shown passing into the vein matter of the northerly dipping branch, concerning which I have certain features upon the plan maps to point out as indicating the Black Rock vein has a common wall, and the mineralization of it merges and forms part of and joins with the mineralization of the north branch.

It may be worth while to pass up with a brief statement level by level because incidentally——

Q. What exhibit have you before you now?

A. Exhibit 71. —because incidentally the plan maps show what the cross sections cannot show as well, namely the structure of certain intervening bodies of ore which unite on the strike the Black Rock vein and the Elm Orlu vein itself, the one which shows to the extreme north of section 21. It will be observed on cross-cut along plane 241, exhibit 81, that between the Black Rock vein and the Black Rock-Elm Orlu vein there is a mass of mineralization permeating the country and spreading southward transversely across between the two. The cross-cut drift——

The Court: Do you call it vein or simply mineralization in the country?

A. I call it vein in these particular points. In certain other points where the veins are spread well apart it is a mineraliza-
959 tion of the country, and there is more country rock than vein material by long odds. But in the immediate vicinity of the junction of the two upon the strike, as in the cross-cut containing survey station 47, the material shown in the cross-cut south of the Black Rock stope is itself ore of commercial value.

Mr. Dickson:

Q. Well, connected with the main——

A. Connecting across the Elm Orlu vein—the Elm Orlu branch of the Black Rock vein.

Mr. Gray: That is 1406 cross-cut that you have referred to?

A. Yes. Now, that that may be perfectly clear I might state in connection with cross-cut 21 that the 1400 foot level, as already stated, represents the bottom of the block model. The northerly dipping branch upon the Elm Orlu vein has already united above this level, on the strike the main Elm Orlu fissure which goes down vertically in approaching and becomes united thus with the Black Rock vein, so that there is a junction of the ore in the Black Rock vein and in the north dipping branch, and on the strike there is also a junction of the Black Rock vein and the Elm Orlu in precisely the same way and in precisely the same form. I might state in connection with all of these maps, if it is only a minute's
960 interruption, that the maps are intended to speak for themselves, and I have not attempted to go into all the details they show.

Q. I will ask you if everything shown in red upon the block model and upon the maps is in ore, or unmistakable vein matter, found in such places?

A. There is. The maps themselves illustrate the structure of the ore and in that connection I might state that upon close inspection it will be found that there is a certain parallelism of the design in red, which is used to represent the ore. That parallelism of lines does not mean that a particular line may be located underground at the particular place; it is a conventional method of showing the direction in which the ore structure runs.

Q. You are pointing now to the Black Rock vein on the 1400 foot level?

A. Yes, and to the stopes upon it. It will be observed that there is along the northerly wall of the Black Rock vein in all cases a structure which follows the direction of the wall and as you proceed southward through the vein matter in almost every instance you find a transverse structure running between that wall and another wall of the vein, there being very often more than a single stope, sometimes as many as three or four stopes between the north wall of the Black Rock vein and its south wall, and linking in between bodies of commercial ore in a transverse direction. The junction or union by mineralization of these different ore bodies in the east end
961 of the Black Rock is identical in shape with the linking and union of the Black Rock vein and the Elm Orlu vein and Elm Orlu north branch in the west end of the mine.

Q. While you are on that subject, I will ask you if you have observed the banding or structure of the ore as disclosed in the stopes of the Elm Orlu-Black Rock vein, where it is separate and distinct from the Black Rock vein?

A. Yes.

Q. What have you to say about that?

A. It is of precisely the same character. The Elm Orlu vein is also made up—the Black Rock-Elm Orlu vein——

Q. You are pointing now to what exhibit?

A. I am pointing now to exhibit- 71 and 72, being together on one roller. On exhibit 72, which is the bottom one, the three principal main bands of mineralization are shown in the Elm Orlu mine and the Black Rock mine and between these at various places where the mine is now still accessible the transverse structure uniting and crossing between the commercial parts of the vein are shown precisely as such transverse structure is shown in the Black Rock vein in the Black Rock mine.

Q. So that the record may be clear, the last place to which you referred, where you had the transverse structure of the Black
962 Rock vein as shown upon exhibit 72, you were referring to the easterly portion of the Black Rock?

A. Yes, east of the Black Rock shaft.

Q. Go ahead?

A. There is in addition to the transverse structure, which is an internal structure between the extreme boundaries of the vein, a structure which passes off into the country southward or southeasterly

from the ore bodies. This structure is in some cases developed definitely in drifting, shown at the point marked 103 on exhibit 69 and is only one of many cases of the same kind.

On Defendant's Exhibit 71 this offshoot structure which has already been mentioned is developed in drift 906, also in drift 821. They are merely mentioned as common features extending out from the south wall of the vein. The internal structure, however, which I have mentioned, is a thing which prevails throughout the length of both mines, and is precisely the geological structure which unites the Black Rock and Elm Orlu veins into one.

By the Court:

Q. Do you mean this transverse structure that you spoke of?

A. Yes, sir; it is shown on a grand scale on the 1300 foot level of the Elm Orlu. On Defendant's Exhibit 77 the structure, individual little veins only a few feet apart are shown upon the map, little veins containing a high grade of zinc ore, which con-
963 nects, not only between the Black Rock and the north dipping branch which shows in between the Black Rock and the Black Rock-Elm Orlu, but it connects the north dipping branch also back into the Black Rock-Elm Orlu vein.

Q. You spoke of little veins; how big?

A. They are big enough in some cases so they would make an individual stope.

Q. What is between them?

A. The interlacing seams and structure of the granite connects them one with the other.

Q. Do you mean it presents there somewhat of an appearance of banding across the vein?

A. Yes, sir; it is a banding almost at right angles between the veins, so that it is almost impossible to tell where one vein ends and the other begins. They are knit together like the clasping of your fingers between the two veins.

By Mr. Dickson:

Q. To what extent has this intervening country to which you are referring been mineralized and converted into merchantable ore?

A. There are enough of those transverse seams of high grade ore, and enough of the little ramifying seams which cross each other very much as the little brown seams do on this specimen, although they are black seams of zinc—enough of those so it is an excellent grade of ore stoped over an area of something like 250 feet in length and something like 150 feet or more in width, or capable of stop-
964 ing to that size on the 1300 Elm Orlu. The ore which runs along the ancient fissure- themselves has its east and west structure. The ore which lies in between is in the openings of the granite, which I tried to illustrate with the leaves of a book yesterday, and in many instances it is better ore than the main fissure.

By the Court:

Q. Was it formed there at the same time as the main veins?

A. It shows on the very face of it that it was, because it spreads out from the main bodies like the fingers of your hand without interruption.

By Mr. Dickson:

Q. You have heard the testimony of certain gentlemen who were called as witnesses for the plaintiff to the effect that on the 1700 foot level of the Elm Orlu the Jersey Blue vein or the Black Rock vein is found to the south of the Rainbow lode, spoken of by the witnesses on the other side. Have you observed the point to which they have alluded in their testimony?

A. Plaintiff's Exhibit 26——

Q. Do you recognize what is claimed by the witnesses on the other side as being the Jersey Blue vein on that level south of the Rainbow lode?

A. I recognize what was referred to, but not as the Black Rock vein.

Q. Indicate on the map?

A. The point shown upon the map in blue and passing
965 about through the southeast corner of the Admiral Dewey claim.

Q. Now, in your opinion is that the Jersey Blue vein or what we call the Black Rock vein?

A. In my opinion it is not the Black Rock vein.

Q. Take that cross-cut on the 1700 foot level of the Elm Orlu and the cross-cut on the 1500 and 1600 of the Elm Orlu, and in connection with those sections explain to the court why you have reached the conclusion that that is not the Black Rock or Jersey Blue vein?

A. It will be observed in Plaintiff's Exhibit 84 that the drawing of the vein features shown in the end of the cross-cut is quite similar—then upon one of the maps is shown a decided northwesterly direction and there are three principal veinlets, mostly of barren vein material, but one of which contains a little clay, namely the one shown on both exhibits with a little blue.

Q. You refer now to Defendant's Exhibit 84?

A. Defendant's Exhibit 84. The blue on Defendant's exhibit meaning clay and the blue on Plaintiff's exhibit having already been described as meaning vein matter.

Q. Describe that exposure which you have just alluded to as being shown in blue on Defendant's Exhibit 84?

A. The exhibit itself shows the position of the various seams, and the dips are indicated upon the exhibits, one of them dipping
966 south 83 degrees and the next one dipping north 70 degrees and the next one north 63 degrees, and they have enough variation of dip so that it is perfectly clear that they belong to the stockwork system which extends out from the south of the Black Rock vein. The description of them can possibly be made clear by

reference to the Black Rock 1400 foot level, where cross-cuts have been driven south from the solid ore of the stope, and the transverse southeasterly structure which I have already described is disclosed very clearly, and the relations of them here shown to the real east and west ore deposition. The veins shown in the cross-cut——

Q. On Exhibit 82, I call your attention to cross-cut 1414 and ask you to describe what is disclosed in that cross-cut in the way of mineralization?

A. Starting from the stopes there is a considerable body, some ten or twelve feet of ore in the cross-cut, bending away from the east and west ore of the stopes and running southeasterly across the mouth of the cross-cut. There is an intervening space of non-commercial vein matter, and then about midway from the entrance of the cross-cut to its south end 20 feet or thereabouts from the stope there is a definite vein of two feet of quartz and manganese and gangue material of the vein; then a space in which there is only the scattered mineralization in the granite, and at the breast of the cross-cut a foot of excellent zinc ore running southeasterly, and in the cross-cut the same identical type of structure and of material which are
967 found in all cases on the south side of the ore bodies.

Q. What is the difference in elevation between the 1400 foot level of the Black Rock shown on Exhibit 82 and the 1700 foot level of the Elm Orlu?

A. About 160 feet vertically; that is roughly. I can look at the elevations here and give it precisely.

Q. Is that a close approximation?

A. Yes; that is my recollection of it.

Q. How near and in what direction from the southeast corner of the Admiral Dewey is this ore that you have in the southerly face of the cross cut that you have referred to on the 1400 level?

A. It lies only about ten or 15 feet northerly of the southeast corner of the Admiral Dewey.

Q. Going to the 1700 foot level of the Elm Orlu on Defendant's Exhibit 84, the vein shown on that which you referred to as being the same as the exposure shown on Plaintiff's Exhibt 26 as being the Jersey Blue vein on that level, how far is that on the 1700 from the southeast corner of the Admiral Dewey?

A. It is about ten feet north of the corner.

Q. Have you any other reason to base upon, observations made by you in the 1500 foot level and the 1600 foot level of the Elm Orlu, which have any bearing on the question whether or not the vein represented on Plaintiff's Exhibit 26 as the Jersey Blue vein is in fact that vein, or the contrary?

A. I think there is plenty of evidence to the contrary.
968 On the 1500 foot level of the Elm Orlu, in which a cross cut driven from the Elm Orlu shaft northeasterly into the southerly end of the little Admiral Dewey claim showed precisely the same transverse structure that has already been described on the 1300 and other levels as spreading out from the south wall of the Black Rock vein, and over toward the Elm Orlu vein. Now, that structure is absolutely the only thing above the 1700 foot level of

the Elm Orlu which does correspond with the veins or veinlets developed in the 1700 cross cut and referred to as the Jersey Blue. There is nothing in the levels above, in the ore body as stoped, which corresponds in strike or in character, except those things which extend off from it, from the main solid body of ore.

Q. On the 1500 foot level of the Elm Orlu shown upon Defendant's Exhibit 81 I will ask you as you traverse southwesterly from the Black Rock vein along that 1501 cross cut if you encountered any zinc vein?

A. Yes. Well, there is some a short distance—there is some right in the south end of the Admiral Dewey claim.

Q. And beyond, southwesterly from that?

A. I will have to look at my notes to find which is zinc and which is not. There are a number of zinc seams.

Q. Just take them up in their order on that level?

A. There is one in the Elm Orlu cross cut on the 1500 foot level on Exhibit 81 which is shown right at the south side line of
969 the Jersey Blue. I will mark it "ZN," meaning zinc. The next conspicuous body——

Q. What is the thickness of that first one?

A. I have mapped it upon my notes as being somewhere about two feet wide. The next one is a series of zinc seams represented by the broad band about 25 feet further southwest, and I will also mark that zinc.

Q. And this is near what?

A. It is the transverse body indicated in red as having a dip of 63 degrees northeast.

Q. How thick is that ore; how wide is that vein?

A. Well, the zone of zinc seams which might be regarded if it were the only thing shown in red lines is a good vein, has a width of thirteen to sixteen feet.

Q. The next one; I don't care about the smaller one?

A. The other, according to my notes, may or may not contain zinc. I have marked them in red to indicate vein material. At the north end of 1509 cross-cut there is a smaller one.

Q. Have you been in court steadily while the witnesses for the plaintiff were testifying?

A. I have only heard a part of it.

Q. Did you hear the testimony of Mr. Winchell and Mr. Searls, Professor Irving and Dr. Weed, and Mr. Greene as to the places where they claimed to have found that the Rainbow lode, so designated by them, had been faulted by the Jersey Blue vein, as they call it?

970 A. I heard the testimony of Mr. Greene and Dr. Irving and Mr. Winchell.

Q. There were several places, one on the 450 foot level of the Black Rock, as I remember it, one on the 700 of the Black Rock—take those two first—where it is claimed there was the most satisfactory, if not conclusive evidence, of such faulting of the Rainbow lode by the Jersey Blue lode. Have you examined these particular places?

A. I have.

Q. Bring down the 450 first, will you. I call your attention, Mr. Finch, to plaintiff's exhibit 11, the 400 Black Rock, marked on this exhibit, and invite your attention to a drift running westerly marked 456 drift, running westerly from cross-cut 451. Indicate that same drift upon defendant's exhibit 67?

A. It is the drift starting from survey 1138 and it should be numbered the same. I will mark that 456.

Q. Did you examine that on the level—did you examine it in the stopes above the levels?

A. That only exists on the level.

Q. What evidence, if any, did you find that vein, Jersey Blue vein or Black Rock vein, as we call it, having faulted their Rainbow lode?

A. None whatever.

Q. Describe everything that is observable there, that you could observe—the condition of the material, I mean by that, and everything else?

971 A. There is, starting at the south of the drift marked 456 and following the easterly length of it, a little slip no wider than this pointer which is followed in the drift. The material on each side of it is granite and fresh granite, where the drift is started. That is not even a vein; it is nothing but a post-mineral slip of the very latest, most recent order. The drift runs through the granite, continuing along the little slip, until it meets the Black Rock—Elm Orlu-Black Rock vein in the region where they are joined into one..

Q. And at that point, what, if any, evidence do you find of a faulting or disturbance of the Rainbow lode by that slip?

A. There is a little disturbance of the Rainbow lode here, as at a great many other points, by the Black Rock fault and by this little slip which curves out of the Black Rock fault into the granite, but other than that there is no dislocation, no disturbance, and there is no vein material crossing into or through the vein matter of the Black Rock lode in any way. The vein structure is undisturbed and pursues its own direction on strike.

Q. What is your opinion as to whether that drift 456 is a faulted segment of the Black Rock lode?

A. It is my opinion that it is not a faulted segment of the Black Rock lode and is not a vein at all.

Q. And give your reasons for that?

A. It is absolutely unmineralized; it has no size more than
972 the liftle slips that traverse the joint cracks of the country—not much more at any rate—it is like the little clay slips that run through the stopes in the mine that are easily referable and easily shown to be little branches across the ore in older rock structure or vein structure, caused by the Black Rock fault. In this case it is not necessary to draw a diagram, possibly, on a larger scale to show it. The map shows it itself. One of the branches of the Black Rock fault passes across the end of the drift, and from that in a sharp bend which is made in the drift itself—from that the little

slip curves out and does not meet at an angle, but curves out from the fault, and going back towards the west joins in with and follows as a part of the Black Rock fault. Moreover, and purely as a matter of geological reasoning, if this were a vein, taking a hypothetical view of it, if it were a vein, the throw along the Black Rock fault is in such a direction that it would not curve towards the left but would curve towards the right, because the movement along the Black Rock fault is in this direction (indicating).

Q. What direction is that, so the record will show?

A. On the south side, towards the west. That means that anything which meets the Black Rock fault, as this vein does, should be dragged and bent up towards the right, if it were a vein, but being a slip branching out from the Black Rock fault, its curvature is as it should be.

Q. Explain that; I don't understand. What is the curvature as it should be, being but a slip?

973 A. The curvature of a branch from a fault would take the lowest possible angle.

Q. Do I understand you regard that slip in drift 456 as a slip from the Black Rock fault itself?

A. I do. I regard it as a little, individual part of the Black Rock fault.

Q. How does the disclosure, the material which was called a vein by our friends upon the other side, in 456 drift, compare with the Black Rock vein on the westerly side of the Black Rock fault?

A. It is really improper to compare them at all, because one is a slip and the other is a large vein.

Q. How large?

A. Ranging from ten or twelve feet to not less than eight feet, as I recollect.

Q. On that level?

A. Yes, on the 400 foot level, just immediately above.

Q. I call your attention to plaintiff's exhibit 14, the 700 Black Rock and to a drift marked 702 running through from cross-cut 1701. Will you locate that on defendant's exhibit of the same level?

A. This is shown upon defendant's exhibit 70, and the drift is likewise marked 702 on the exhibit.

Q. In the vicinity of the easterly end of this drift 702, in another place where, as I recall, certain of the plaintiff's witnesses claim there is the most unmistakable evidence of a faulting of the

974 Rainbow lode by the Black Rock, what have you to say about that, Mr. Finch?

A. The evidence is about equal in weight with the evidence on the 450 foot level. In other words, in my mind, not only no evidence at all but a great deal of evidence to the contrary.

Q. What is there disclosed in the 702 drift as to the vein or vein material?

A. There is an offshoot or a little stringer shown on 702 drift which is identical with a little stringer of the same kind shown in cross-cut 702 and in all cross-cuts in the two mines. There is also,

of a totally different age, a little slip similar to that shown on the 450 foot level possibly the same thing and possibly not.

Q. What slip do you refer to now as being of a different age, the one on the 702 drift?

A. Yes, the one shown as being upon the 702 drift.

Q. You mean that slip is later than the Jersey Blue or Black Rock vein?

A. Later than all veins.

Q. What are the evidences of that?

A. It is later than the vein which follows also coincident with it in the drift because it is seen departing with it, not coincident with the little vein stringer at all except locally. At the mouth of the drift in station 701 it departs entirely from the little veinlet and cuts through the granite, showing that there is no relation
975 of genesis between the veinlet and the slip. It cuts across the vein matter of the slip, showing it to be later than the vein matter of the stringer. It cuts across the vein matter of the Black Rock-Elm Orlu vein and behaves precisely as the little slip on the 450 foot level, forks into and joins the Black Rock fault. I see evidences of its later age in that all mineralization exists in the little slips as in the Black Rock fault itself.

Q. How does that little stringer you speak of disclosed in that drift compare in size and otherwise with the Black Rock vein westerly of the Black Rock fault?

A. There has been an effort to draw it approximately to scale on exhibit 70, but it is really impossible to do so. It is nothing but a little crack in the rock, surrounded with clay on each of its faces.

Q. Do I understand that on the 700 of the Black Rock you have just been referring to, that the slip encountered in the drift 702 cuts the stringers of ore that are found in that drift?

A. Yes.

Q. And does not conform with them?

A. No.

Q. When plaintiff's exhibit 13, the 800 level, was done, I believe you said there was something you wanted to refer to. What was it?

A. It all depends upon whether you care for a complete explanation of the rather complex region or faulting by the Black Rock fault.

976 Q. I do. Bring down our corresponding level or the same level. You may use either plaintiff's exhibit 13 of this level or defendant's exhibit 69, and explain that complex condition that exists, to which you have alluded?

A. It would really be better to make a sketch on a larger scale, but it might take time, but if the court can see at this distance I will not do so. All the details that I could find on the ground are shown upon these maps. Coming westward from a point not far from the west end line of the Black Rock claim are two parallel drifts, containing in the first place the north one, the main body of the Black Rock vein. South of it the usual stringers out into the irregular footwall of it; passing eastward along a wide vein, wider

than the drift, to survey station 95, the point I now indicate, the vein material of the Black Rock vein—the principal part of the vein material—passes from the drift towards the south, it passes out of the south side of the drift. The drift from this point on towards the east is the—is to a large extent driven entirely upon that branch of the Black Rock fault which in most places forms the hanging wall of the Black Rock vein. They are coincident; it does form the hanging wall of the Black Rock vein up to station 95 and almost to station 96, thence the drift curves around——

Q. Thence easterly?

977 A. Thence easterly the drift curves around and follows the fault, only the fault being made up of more than one layer of clay until the breast is reached, where the fault then joins the Black Rock vein, the Black Rock fault as described by the plaintiff's witnesses and becomes one and the same fault, joined into one. The same nature of the Jersey Blue vein as described by the plaintiff and of the Black Rock vein as I am using the term, is found south of the fault material, which by its mere lack of coincidence shows itself to be a post-mineral fault. The same vein matter is found south in a cross-cut which could be number 817.

Q. And you have so numbered it?

A. I have so numbered it. In the cross-cut, a distance of about eighteen or twenty feet from the entrance to it, the heavy quartz of the Black Rock vein is found, slashed across by the Black Rock fault—the main part of the Black Rock fault. Passing southwards still farther in the cross-cut on the other side of the main part of the fault is again found a body of quartz which shows not only in this cross-cut but one a little farther east, which is probably the northern-most principal body of the Black Rock vein. Still farther south of the Black Rock fault are other characteristic bodies coming in from the Black Rock vein as they do at all levels where the junction of the two veins has been developed. In 817 cross-cut, at a

978 dist-nce of only five or six feet from the main body of the Black Rock fault, the little slip is found which has been driven upon on the 702 drift. This little slip, as does the main part of the Black Rock fault—this little slip faults to a certain extent the ore in stopes which have been driven at this level and the 700 level not far below upon the main vein.

Q. Is this slip, in your opinion, a branch or a stringer from the Black Rock fault?

A. Yes, it is. It shows itself to be.

Q. How?

A. By the way it curves and branches off and by the materials which it contains, by the fact that it is absolutely unmineralized in itself, and that the ore structure in the stopes on the 700 level of the Black Rock, stopes which come from above up to station 918, stopes which come from the west up to station 916 contain ore which abutts with its proper structure parallel with its own direction right against the plane of the post-mineral fault.

Q. Now, defendant's exhibit 69, the stope that you are referring

to is represented as we go west as curving and actually uniting with the Black Rock fault; is that a correct representation?

A. Yes, I believe it is.

Q. And is there anything further you wish to say on that?

A. Nothing except its post-mineral character as shown in the slip itself, whether it is related to the Black Rock fault or not.

Q. Why?

979 A. By the fact that it is unmineralized and the fact that it does contain fragments of all the materials which are traversed in crossing the veins.

Q. On this same Exhibit 69 I see what I take to be a branch of the Black Rock fault following for some distance the hanging wall or north wall of the Black Rock vein?

A. Yes, sir.

Q. What evidence is there of that being a post-mineral fault?

A. The same identical evidences that are found in the Black Rock fault, the fact that, except where it coincides with the walls or with the structure in the veins, preexisting structure at points where the veins had considerable irregularity, as at this particular point, this fault goes across the country, and that is shown and is seen to join the other branch of the Black Rock fault, and they became one; and then the materials in the fault gouge itself. By taking the fault gouge at almost any of these points, any one that I have seen along the north wall of the Black Rock vein, and picking it apart, we find fragments of zinc, quartz, rhodochrosite, and altered granite, absolutely everything that is shown in the veins. Now, those fragments could not be there, broken up, unless the fault had been made since the fragments were formed in vein form.

Q. Calling your attention to Plaintiff's Exhibit No. 8, the tunnel level, where are shown two branches in green of the Black

980 Rock fault, one northerly and one southerly of the ore, which is claimed by the Plaintiff to belong to the Rainbow lode, and as I understand it, it is claimed that, by reason of the two bands or stringers of the Black Rock fault it shows the faulting of the Rainbow lode by the Jersey Blue, have you anything to say upon that, how it could have been revealed if such were the fact?

A. Assuming hypothetically that there were a Jersey Blue vein coming down through the drift marked No. 4 upon Plaintiff's Exhibit No. 8 which I now indicate—assuming that that were a vein, which is not the case, and that it were a vein older than the Black Rock-Elm Orlu——

Q. Younger, you mean?

A. Yes, younger than the Black Rock-Elm Orlu vein, and that this drift 25 contained a segment of the same vein, on Exhibit 65, and that it is a fault vein, the Black Rock-Elm Orlu vein must have been dislocated by it, even though it were a fault vein which had been healed up between the two segments of the Black Rock fault, it would nevertheless continue to form a fault vein.

Q. And distinguishable?

A. Distinguishable by its faulting, even though it were replaced

as a cross vein, so that it might be indistinguishable in its mineralogy, it would still be distinguishable as a dislocating fault vein.

Q. Would it be distinguishable in its structure?

981 A. It should be distinguishable in its structure.

Q. On the 1500 foot level of the Elm Orlu on Plaintiff's Exhibit 23 the Black Rock vein or Jersey Blue vein is represented at the westerly end of the Black Rock claim as following along the northerly boundary practically of the so-called Rainbow lode, and then where cross-cut 1513 runs northerly to and across the vein the representation there is of the Jersey Blue cutting through and lying within the outer boundaries of the Rainbow lode. Have you been able to make observations there?

A. I made observations to the contrary, and I believe I have reasons, perfectly clear reasons, for an opinion to the contrary.

Q. Give them to the court?

A. The 1500 level of the Elm Orlu——

Q. Referring to Defendant's Exhibit 81?

A. Referring to Defendant's Exhibit 81—connects with a stope passing upward from the 1400 foot level of the Black Rock. The stope is shown upon Defendant's Exhibit 81. There are other cross-cuts to the east of cross-cut 1511, shown upon Plaintiff's Exhibit 23. There is the cross-cut 1501 shown upon Plaintiff's Exhibit and cutting the ore at the west end of the Black Rock claim. In each of these cases there is a heavy fault gouge following at all the points where it has been opened up along the 1400 foot level stopes. At this level and only a short distance below, continuously for

982 four or five hundred feet, 450 feet anyway, along the north wall of the stope that gouge is seen, and it is an identifiable, recognizable gouge, and has been continuously developed. It is that gouge which has been identified as the Jersey Blue vein at the point near the numbers 1504 upon the map.

Q. And at the west end of the Black Rock?

A. At the west end of the Black Rock. Another gouge, a smaller one, has been identified as the Jersey Blue vein by the plaintiff in cross-cut 1511, near the point where the cross-cut enters the Black Rock stope. Those gouges have strikes easterly and westerly.

Q. How near is that to cross-cut 1513?

A. It is in cross-cut 1513, near the point where it enters the stope. The strike of that gouge is shown moreover in the cross-cut upon Plaintiff's map, and is shown to be pointing as developed in that cross-cut to the similar gouge existing in 1501, which as a matter of fact——

Q. At what point?

A. At a point about 15 feet north of the end line of the Admiral Dewey claim, which, as a matter of fact, we know to be the same gouge that is shown in 1501.

Q. How do you know?

A. Because it is developed sufficiently at other points below to demonstrate that.

Q. Let us see the 1600 of the Elm Orlu?

983 A. Both of those gouges last described are post-mineral gouges.

Q. By the way, have you got this gouge that you have just referred to on the 1600 foot level of the Elm Orlu; state whether in your opinion that gouge is the gouge of the Black Rock fault?

A. The 1600?

Q. It is the 1600 Elm Orlu. Is that the gouge that is shown in 1501 cross-cut that you refer to, and again at the northerly boundary of what is represented on Plaintiff's Exhibit as the Rainbow lode near the west end line of the Black Rock claim; that is the gouge I refer to. Do you understand?

A. Yes, it is a gouge of the same age as the Black Rock gouge; it is post-mineral, like the Black Rock gouge, and has been shown on the 800 foot level of the Elm Orlu; on the 1000 foot level of the Black Rock, to be united with a branch from the Black Rock fault.

Q. I call your attention to Plaintiff's Exhibit 24, the 1400 Black Rock. Have you got the map of the same level down?

A. Yes, that corresponds with Defendant's Exhibit 82.

Q. On Plaintiff's Exhibit 24, what is called by the Plaintiffs the Jersey Blue vein is shown traversing the Rainbow lode at stations 448, 446 and southerly of station 310, by cross-cut 1410, and thence easterly a little south of station 247. In your opinion is
984 that which is colored in blue on the Plaintiff's Exhibit here the Jersey Blue vein, or does it form any part of the Jersey Blue vein?

A. No, it is not.

Q. What is it?

A. Except that all the area colored in blue on this map is a part of the same ore body which is developed continuously by the Jersey Blue raise to the surface, there is, to my knowledge, no vein which crosses through that stope as indicated by the blue line.

Q. It is claimed that that which is claimed to be the Jersey Blue vein which is shown at station 247, faults the Rainbow lode in this little piece of work running southwesterly just south of station 247. Have you observed that, and what indications, if any, of faulting, do you find there?

A. I find the evidence of a fissure which is indicated upon Defendant's Exhibit 82 running in a northeasterly direction.

Q. What fissure?

A. A fault, a post-mineral fissure.

Q. Is that the Jersey Blue?

A. No, that is one of the post-mineral slips in the ore. For the additional reasons of the lack of the existence of any such vein as shown upon Exhibit 24 at the level of the 1410 cross-cut and the 1414 cross-cut, I have definite observations at both of those points, and in each instance the heavy blue line upon Plaintiff's
985 Exhibit passes through a fault slip, which does not have the direction shown by Plaintiff's Exhibit, but has a more northwesterly direction, and is transverse to the ore.

Q. Is that represented on Defendant's Exhibit 82?

A. It is. Moreover, the particular things which exist at points

where the heavy blue line crosses the mouths of these cross-cuts, where in each instance only one of several similar post-mineral slips, branching southeasterly from the vein, and the ones through which the blue line passes at the mouths of the two cross-cuts are not the same ones at all, but different ones.

Q. Why do you say so?

A. On account of their strike and the fact on their strike each of them at the mouth of 1410 cross-cut for instance passes into the ore and towards the north wall, and the same is true of the one at the mouth of 1414 cross-cut which can be readily seen and its direction taken with the compass.

Q. Is there any gouge accompanying those slips?

A. Yes, in each instance where Exhibit 82 shows the blue lines through the cross-cut, there is gouge.

Q. Have you made an examination to determine to your own satisfaction where the northerly wall of the so-called Rainbow lode crosses the southerly side line of the Black Rock claim?

A. Yes, sir.

Q. How far from the southwest corner of the Black Rock
986 claim do you find or believe that the northerly wall of the so-called Rainbow lode crosses that line?

A. At a point about 205 feet southeasterly, measured along the south side line of the Black Rock claim from the southwest corner of the claim, it is disclosed in a drift near the surface driven from the McLeod shaft.

Q. Is it shown on Defendant's surface map?

A. It is shown upon Defendant's map Exhibit 65, a little working very near the surface.

Q. Will you point that out?

A. Here.

Q. How is it marked, is there any station number?

A. There is no special mark to that, because it is just completed.

Q. Well, designate it in some way upon that exhibit?

A. I have marked it "Drift on north wall" on Defendant's Exhibit 65.

Q. I will ask you to state to the court in your own way any and all observations you have made, Mr. Finch, with reference to the Pyle branch, so-called, and the raise therefrom and the continuation upwards of that vein toward the surface, or what you believe to be a continuation upward toward the surface or to the surface?

A. The section running north and south through the
987 Black Rock shaft practically follows the Pyle raise.

Q. Section 28 on the block model?

A. Yes; it practically follows the Pyle raise up to the 450 foot level of the Black Rock.

Q. Were you able to examine that raise from the bottom upward before it was timbered?

A. I have seen it at certain points while it was in progress.

Q. Well, we do not make any contention that it exists up as far as what they call the top of the ore, where those big stopes are—but taking it on Plaintiff's Exhibit No. 46, the model, it is the same Pyle

raise I referred to as going up to near the 451 level, then a drift driven from the top of that branch of the raise westerly to the 451 level, and then continuing on upward as far as the Plaintiff's red extends there. That I understand to be the highest point at which the plaintiff's witnesses, any of them, have seen what they call the Pyle branch, and where it is claimed by some of them there is a slip, which has displaced it. Have you seen that place at the top?

A. Yes, I have been in that part of it.

Q. Have you found what you believe to be the Pyle branch of the vein above that, or anything that you think should be correlated with the vein disclosed in the Pyle raise to what our friends upon the other side say they find—this slip?

A. I made certain observations and for certain reasons I
988 believe that the fissure which is developed along the drift on the 500 level of the Elm Orlu, if there be anything to correspond with the Pyle vein, is the Pyle vein itself.

Q. What have you in that drift in the way of mineralization?

A. We have a definite well defined fissure which passes along the drift from the point where the raise connects with the 500 foot level of the Elm Orlu, and is followed continuously along the drift for some 150 feet or thereabouts, and it is a fault fissure with gouge similar, in fact identical in character with the gouge seen at many points along the south side of the Pyle vein.

Q. In the Pyle raise?

A. Of the Pyle vein in the Pyle raise, and in the 450 level, and deeper down. It is a gouge within which nothing is found in 450 level of the Black Rock to correspond, except a similar gouge along the wall of the Pyle vein. My own personal view of the matter is that there was a Pyle vein usually well mineralized down in the bottom of the mine, which had an east and west strike down there, which in passing up through the raise varies in its strike, which gets at certain points to be northwesterly; a drift on the 800 has been carried to the point where it shows the swing to the northwesterly direction, corresponding with the strike of the Pyle vein up through the raise to the 450 level, and that——

989 Q. Does it strike where you have seen it nearest the top of the Pyle raise—what is the strike there in the ore?

A. About due northwest.

Q. Go ahead.

A. And that this gouge which forms the south wall of the Pyle vein is likely to be, and I believe is a post-mineral gouge to a certain extent, and that its position after it passes up through and beyond the ore bearing part of the Pyle vein is determined by an ancient fissure, unmineralized at the 500 foot level, but nevertheless doubtless existing as a fissure which has been followed by the post-mineral gouge, and somewhat enlarged, but not changed in its position. At the 500 foot level of the Elm Orlu this fissure has a direction similar to that of the vein at deeper points, and has a dip toward the south, and is the only thing which correlates upward with the Pyle vein.

Q. That is, as far as the developments have disclosed?

A. Yes, sir.

Q. What is the flat dip toward the surface?

A. It varies from 60 degrees to 50 degrees, from the raise to the end of the little west drift.

Q. Do I understand you to say that there are places in the Pyle raise where the ore there encountered or the vein there encountered is shown to have a northwest strike?

A. Oh, yes.

990 Q. Whereabouts?

A. At the 450 level, at a point about 75 feet below the 450 level, where the raise has been opened up, and the cross cut driven; at a number of points between the 450 level and the cross cut last mentioned, and at certain points below the cross cut on the way down to the 700 foot level, and in the north end of the 800 foot level drift, which I would like to show in that connection. I might state that in the lower parts of the raise below the 700 foot level the vein is found running through the ends of the raise. The raise lies in a general east and west direction, the timbers of it, as you pass up from 715 it gradually turns around and swings to the south side of the raise and crosses the northwest corner of the raise, showing the change of strike.

Q. What is the course of the Pyle vein shown in the Pyle raise on the model exhibit 46, in the drift running southeasterly from the 451 level to the top of another branch of the Pyle vein?

A. My idea is that the course of it is shown by the drift as part of the Pyle vein. Another part of it branches off towards the northwest and that would be shown on the 450 foot level. The Pyle vein does not differ from the other individual veins like the Black Rock and Elm Orlu in having transverse branches cut across from it in the deep levels of the mine over to the other veins, and it is such veins as are shown on the 450 level.

991 Q. Is the Pyle raise indicated upon this level?

A. Indicated upon exhibit 67. I think we better name it. I will mark it "Pyle raise" on exhibit 67 and it is already named on 68. At the 450 foot level the Pyle fissure is shown on the south side of the raise, a well defined, definite gouge wall. Passing northwesterly from that are a series of branches, probably similar to this, which branch away from other veins. On the 800 foot level—the little crosscut which I have mentioned, driven at a point about sixty-five feet below the 450 is shown upon exhibit 68. The same condition exists there except the heavy gouge is not shown on this exhibit.

Q. Is it—is not shown on exhibit or does not exist on the ground?

A. It does exist; it has been opened up there. On the 804 drift which I referred to some time ago as being the point where the change of strike of the Pyle vein has been indicated, the drift has been driven along the vein and has developed a short change of strike, similar to that which shows in the raise a considerable distance above this level.

Q. A question that I might have asked you in the opening of your examination I will ask now: What has been the extent of your investigation as a mining engineer of this Butte district?

A. I have visited and examined a considerable part of the hill,

some of the principal copper mines of the district and have
992 been called upon to do so from 1903 at comparatively short intervals up to the present time.

Q. Has your examination in these twelve years been of sufficient frequent intervals and sufficiently extended to have made you, in your opinion, familiar with the vein system in the district, their structure and relation to each other?

A. I have made a great deal of study of it and have formed definite opinions.

Mr. Dickson: That is all.

Cross-examination.

By Mr. Gray:

Q. You have, in the investigation of the problems in this litigation, brought to your assistance that experience which you gained in other mines of the district?

A. So far as it had any application, yes.

Q. And the observations which you made there in the period have assisted you in the conclusions which you have arrived at here?

A. I will put it the other way. I found certain facts in these mines which I afterwards discovered were quite consistent with conditions which I had found in other parts of the district.

Q. So then we do not disagree in saying that the general geological structure here is no different in its broad lines, from that in other parts of the district?

A. In the same type of veins, no.

Q. Mr. Finch, you have stated that what we term the Jer-
993 sey Blue vein is in your judgment not one of the northwest series and that what we have termed the Rainbow vein and what we have also termed the Jersey Blue vein belongs to the east and west series?

A. Well, that is not entirely true. I have tried to isolate in my statements that part of the Jersey Blue described by you which I am attempting to describe as the Black Rock vein.

Q. I understand the western portion of it you believe is a northwest fissure?

A. Yes—at least another fissure.

Q. What do you consider it to be; a northwest vein?

A. I think it is quite likely a northwest vein.

Q. Before we go farther—where did you observe it?

A. On the surface of the Jersey Blue.

Q. Just point out on the surface of the Jersey Blue where you observed this northwest fault vein that you spoke of?

A. It has not been placed upon defendant's exhibit 64.

Q. Well, you may place it there?

A. But it exists in about the position shown by your exhibit 4.

Q. I beg your pardon, Mr. Finch. Just indicate the point where you did observe it?

A. In the vicinity of the Jersey Blue shaft and upon the hillside

in a northwesterly direction into the railroad cut and south-
994 easterly of the Jersey Blue shaft a short distance until the wash becomes so deep that it covers it.

Q. Now, for what distance southeasterly of the Jersey Blue shaft did you observe it?

A. Well, I should have to make that only an approximation.

Q. Well, as nearly as you can?

A. I should say—my recollection is that I found a little exposure of it at the foot of the dump from that shaft, and that was the last one.

Q. An exposure?

A. Yes, not very far from the shaft.

Q. Did you take its course?

A. No, that would be—it would be a useless thing to do that on the surface.

Q. Just answer my question?

A. In the tracing of a vein of that kind it is necessary to take the outcroppings of it and if it does show continuously, that is the tracing of the vein, the strike and the dip of the vein, any particular—at any particular place at the surface——

Mr. Gray: Just answer the question.

Mr. Dickson: I insist that he be permitted to finish his answer.

The Court: You are hardly answering counsel's question.

A. I was explaining why I didn't take the dip.

The Court: He asked you if you did take it or did not?

995 A. I did not, nor the strike.

The Court: Course, I think he asked you?

A. Yes.

Mr. Gray: That is the only place you observed it, that is that direction, southeasterly?

A. I made the correlation of the probability of it.

Mr. Gray: I ask your honor to ask him to answer the questions.

The Court: Read the question.

(Question read.)

A. No, I think not.

Mr. Gray: All right, where else?

A. I think it was identifiable in the fault shown upon plaintiff's exhibit 4, passing through the words "Elm Orlu."

Q. Just indicate that on the surface, where you observed it at or under ground, on your exhibit 64?

A. It shows in about the middle of trench "B."

Q. This blue streak is about the middle?

A. Right through the letter "L."

Q. And the course of that blue streak is what, in that trench?

A. About due northwest.

Q. Now, from that point to a point at the bottom of the dump of the Jersey Blue shaft did you observe it at any place?

A. No.

Q. How far is it between these two points?

A. Oh, that is a very considerable distance.

996 Q. Well, give it to me?

A. Oh, some eight hundred feet.

Q. Produce it upon the course which it has in trench "B" and which you have given, where does it come with reference to the Jersey Blue shaft?

A. Oh, I don't know that I have given that much thought. I identify——

Q. Just a moment. We will get that long pointer. I am laying that in the course that is shown in trench "B." How far northerly of the Jersey Blue shaft would that take it, projected upon its course?

A. I don't think I can——

Q. Just answer the question.

A. I don't think it would take it anywhere in that direction past the Black Rock fault.

Q. Then you took the Black Rock fault into consideration in correlating it with the Jersey Blue shaft?

A. No, except the Black Rock fault necessarily interrupts that vein and the correlation is made entirely on account of the character of the vein.

Q. Now, then, as it crossed the Black Rock fault, in order to get it down into the Jersey Blue shaft how many feet, in hundreds or fifties, do you think it had been moved southerly by the Black Rock fault?

A. I didn't figure that at all. It is correlated entirely on the character of the vein.

Q. And you observed it only in the bottom of the dump of the Jersey Blue shaft?

A. No, I observed it all the way up the hillside.

997 Q. From the Jersey Blue shaft northwest?

A. Northwesterly.

Q. Where did you next see it from the Jersey Blue shaft, going northwest?

A. At very frequent intervals from the Jersey Blue shaft to the summit of the hill and the railroad cut and very much as has been described by Mr. Greene.

Q. There is a good exposure of it all the way then?

A. Not all the way by any means.

Q. And its course from the Jersey Blue shaft to the point where you saw it in the railroad cut is what?

A. About north sixty-five west.

Q. Have you any notes of it?

A. I haven't any notes here on it. It is on a little map which I haven't with me. About north sixty-five west I should say it to be.

Q. You have brought to your assistance all of the information which was possible concerning the strike of that vein, have you?

A. All that I had, yes.

Q. And all that was supplied to you by the defendant company?

A. Nothing was supplied me.

Q. Did you see their old working map with the drift from the Jersey Blue shaft delineated on it, with its course given?

A. Yes, I have seen such a map.

998 Q. What is the course of that drift?

A. I don't recall and I don't know that the drift is on that vein because I haven't been in it.

Q. You gave no consideration to that drift from that shaft in determining the course of that vein shown in the Jersey Blue shaft?

A. No. The outcrop is sufficiently distinct.

Q. That is, from the shaft northwesterly?

A. Yes, sir.

Q. You are a mining engineer as well as a geologist?

A. I believe so, yes, sir.

Q. What are the wall plates of a shaft?

A. The wall plates of a shaft?

Q. Yes.

A. They are the timbers which run along the side of the shaft.

Q. Along the walls of the vein?

A. If it is an inclined shaft, follows the vein.

Q. What is the course of the wall plates of the Jersey Blue shaft?

A. I think they are indicated correctly on that map.

Q. North 75° west?

A. Something like that, yes.

Q. Did you attempt to project the line of these wall plates in a southeasterly direction for the purpose of determining where this vein might run if it continued upon its course?

A. No, and I wouldn't do that in any case where I have

999 a perfectly clear outcrop which can be seen by any one who walks up the hillside?

Q. And you followed the same course that you got from the Jersey Blue shaft to the railroad cut on southeasterly, did you, in order to get in to trench "B"?

A. No, didn't follow it at all. It is just a vein of a certain type and of a northwest direction which is correlated with another of similar type south of the Elm Orlu.

Q. Now, Mr. Finch, going back to the distinction between these veins, the old veins and the northwest vein. I believe the first difference that you suggested was that the old veins dipped south?

A. I think they do, from my observation of them.

Q. Are you familiar with any of the old veins in the camp that dip north?

A. I don't recall at this time any of the old east and west veins that have a dip for a great distance to the north.

Q. Are you familiar with the Colusa-Shannon—first let me ask you to name those that dip south, upon which your conclusion is based?

A. The Anaconda vein in general, which is the Original vein, the Leonard vein, and that entire system which runs west—which runs east through the High Ore, and all the veins—the Badger—are south dips.

Q. These are all that you now have in mind?

1000 A. I have in mind a cross section through the entire district from north to south, so far as my recollection goes, shows all east and west veins with a southerly dip.

Q. All right. Now, let us take up the Colusa-Shannon. Are you familiar with that vein?

A. I haven't seen it in a long time.

Q. It does dip slightly to the south near the surface and then as you approach depth dips north, doesn't it?

A. Not as I recall, no.

Q. That is one of the old veins?

A. I don't recall that to be the case.

Q. Isn't it one of the east and west veins, the Colusa-Shanon?

A. Yes, I think so.

Q. The Corra dips north, doesn't it?

A. I don't remember about that.

Q. It is one of the old veins, isn't it?

A. I don't remember it by that name.

Q. The O'Neill dips north, doesn't it?

A. I think it does for a certain distance.

Q. It is one of the old veins, isn't it?

A. I don't believe I can answer questions when you use those names without reference to maps because some of these places it is a long time since I have been in and the name you use doesn't suggest any picture to my mind of the vein.

1001 Q. Aren't any of these veins that I have mentioned well known east and west veins in this camp?

The Court: Ask the question whether they are to this witness. Of course if he don't recognize them he can't answer.

The Witness: I can get, during the noon hour, information, quite complete information on that.

Mr. Gray: Information upon which your distinction has been drawn?

A. These names I have seen frequently, and I can tell you about them if you care to have it done when I come back to court.

Q. The north Wild Bill, do you remember that?

A. I don't remember it by name, as I say.

Q. There is only one that you do remember, and that is the Badger?

A. Yes.

Q. What is the dip of the Badger?

A. It dips south as I recall it.

Q. It has not been long since you examined the Badger?

A. I have been in the Badger, yes, in the last two years.

Q. When you first started an investigation of the problems here, it was about three years ago?

A. Yes, sir.

Q. Since that time you have given a good deal of attention to the geological problems presented and to the development work in these properties?

1002 A. I have studied the geological problems pretty thoroughly.

Q. What was the first development work which you suggested in connection with the ascertainment of the facts here?

A. To develop the Black Rock vein to the surface.

Q. Through what workings?

A. Through the long raise which is a continuation of the raise driven by the Elm Orlu Company up to their 800 foot level.

Q. Called the wet raise or the Clark raise?

A. Yes; it used to be given the name the Clark raise.

Q. Did you go through that during the time it was being driven?

A. Oh, no; I went through it afterwards.

Q. You never saw it till it was completed?

A. No.

Q. Have you been in the Clark raise before it was started up from the 800—I mean from the 1000?

A. Well, that was finished before that.

Q. You had not been up it?

A. Oh, yes, I had been up it.

Q. That is a very wet raise?

A. Very disagreeable, as most raises are.

Q. Did that suggest anything to your mind?

A. It suggested the wetness that I find in the east and
1003 west veins of the same kind generally in the district.

Q. Isn't it true that that is one of the distinguishing features between the northwest veins and the east and west veins?

A. My impression was that the east and west veins were the more wet, and that in the northwest veins, on account of their gouge and clay, that the water did not move so freely in them; that has been my observation I believe.

Q. Were you struck with the fact that the Jersey Blue vein was very persistent and very regular, both upon its dip and upon its strike?

A. Yes.

Q. Were you impressed with that as relating to the irregularity of what we term the Rainbow lode or the Rainbow vein upon its strike and upon its dip?

A. I have been impressed with the exact similarity of both veins; with the regularity of the north wall of the Black Rock vein and the irregularity of its south wall, and the same thing with reference to the Elm Orlu vein.

Q. The north wall of the Black Rock vein, as you observed it, was regular in its dip, was it?

A. Comparatively regular; almost exactly parallel, as any section will show, with the Elm Orlu vein.

Q. Isn't it true that the sections, almost any of them, show, on the contrary, that this wall dips southerly for a long dis-
1004 tance before it again begins to dip northerly?

A. Section No. 7 shows the Elm Orlu vein going down parallel with the Black Rock vein, as we call it, to the deepest workings in the mine, and they hardly deviate from that parallelism from bottom to top.

Q. And by what you mean is the green line shown on exhibit 7?

A. No, I mean the Elm Orlu vein fissure which goes down on its

dip, with its own direction. I do not mean the link or northerly dipping branch of it, which is erratic, and local between the two.

Q. I understand you to say that one distinction that you drew between the veins of the northwest series and the east and west veins was that the northwest veins did not carry mineral near the surface?

A. That is the general condition.

Q. And that you believed—that was one reason that induced you to believe that the Jersey Blue belonged to the east-west series?

A. I think that is one of the sharp distinctions.

Q. And you said there was commercial ore in the Black Rock tunnel a very short distance below the surface?

A. Yes.

Q. Mr. Finch, you testified in the Nipper case.

A. Yes, sir.

Q. How far below the surface was the apex of the blue vein in that case?

1005 A. Well, that is a good while ago. It is not very far.

Q. 40 or 50 feet?

A. Something like that.

Q. You testified that there was commercial ore in the blue vein in the apex drift in that case, didn't you?

A. I think that is true; it is right near its intersection with the east and west vein.

Q. Did you attribute it to that in that case?

A. I don't remember whether I did or not. That is the geographic relation, anyway.

Q. There is commercial ore in the blue vein within 40 feet of the surface, isn't there?

A. I believe there is—at least——

Q. There are large stopes within 300 feet of the surface?

A. At least there are fragments of it, and those large stopes within 300 feet of the surface are made on ore dragged from the east and west vein, as I recall.

Q. How far did they extend from the east and west vein?

A. At the time I saw it not very far, as I recall.

Q. How about the stopes in the Little Mina?

A. If you wish any exact knowledge of that, I will be glad to get my note books and look it up for you.

Q. I just wanted to get the source from which you drew
1006 the inference that the northwest veins did not contain ore near the surface.

A. I drew it from the fact that I have studied a great many of them, and found that to be the case.

Q. How about the Little Mina stopes in the blue vein; are you familiar with them?

A. I don't think there are many Little Mina stopes near the surface, except near the intersections of the east and west veins, as I recall it.

Q. Would you just as soon look that up and see if they do not

extend a thousand feet from the intersection of the east and west veins?

A. Near the surface?

Q. Yes.

A. Yes, I will be glad to look that up.

Q. Mr. Finch, you said you desired to say something with reference to the matters I asked you about before lunch?

A. Yes. As far as the time permitted during the intermission I looked up the specific matters upon which you asked questions. First, upon the matter of the dips of the veins of the east and west series. I find that the north Wild Bill vein, as far as I know it at all, is a north dipping vein, and that there is, to the best of my recollection, at least one other case that I have seen; I think you called the Colusa vein, which has a north dip. You mentioned the O'Neill, I believe; that I have not seen. Those are the only exceptions of which I have any knowledge. On the other hand
1007 I find that I have a good deal of knowledge of the dip of the Anaconda vein, and throughout the Parrot-Original region, that dips something like 70 degrees to the south, and in the Neversweat region, and in the Anaconda mine, where I have seen it, it dips that much or more to the south. The Leonard vein dips to the south. An east and west vein which I think is called the Speculator, found lying south and southeast of the Speculator shaft, dips to the south. The Badger vein which I have recently studied, dips down to 1600 feet almost exactly vertical, and from there on downward it dips to the south at an angle of about 80 degrees. The vein in this particular instance does dip to the south, as shown clearly upon every section—the two veins.

Now, the other matter, as to the ore bodies in the blue vein system. I find that at the time of the so-called Nipper case there was considerable development upon the vein which gave the name to the whole system, the original blue vein, and that in that there were found small ore bodies near the surface. Those bodies were not of very considerable extent or of very considerable importance, but they were important as proving the existence and continuity of the vein. This vein is commercially productive, beginning, as I now recall it, at a depth of some 1000 feet in the Parrot and Original mines, and it becomes highly productive with very rich copper ore, which proceed- and continue- downward from that depth. The Edith May vein, which is another northwest vein, begins its ore
1008 bodies somewhere between a depth of seven and eight hundred feet, and is one of the great producing veins of the district at that depth. The Jessie vein has in it one sporadic occurrence, a small amount of ore almost at the surface in the Mountain View claim, oxidized copper ore, very short in extent and very small in quantity, but the Jessie vein in the North Butte property begins to be a producing vein of a real commercial value at a depth of a thousand feet, and continues to be productive from that depth on. Those are the principal northwest veins of the district.

Q. In the Jessie, aren't the stopes on the 300 and 550 levels large stopes?

A. Very small stopes.

Q. Going upon the end of the—these ore bodies were as far as one thousand feet from the end of the vein?

A. Sometimes in considerable ore bodies, that I have described.

Q. And at the depth of the 300 feet there were little stopes in the Little Mina?

A. Not so far as I examined it, no. So far as my knowledge goes of the Little Mina the ore deposits in it are very unimportant.

Q. In the development of your theory which you have testified to here, you suggested that originally in this granite country under observation there were fissures formed which ultimately became the veins and that they were not fault fissures. Did I so under-

1009 stand you?

A. Yes, not fault fissures of any considerable displacement, the actual fissures of the east and west system.

Q. And in your judgment the ore formed first along this ancient fissuring?

A. This is exhibit 93. There are three very rough drawings on it. The one I am marking No. 1 refers to the simplest type of vein, which is the first type of fissure formed in the development of veins of this type. The No. 2 is a second step and No. 3 is the extreme stage of complex fissuring which makes a complex or conjugated or link lode seams, as we have described in this case. No. 3 is the only one that applies to this case.

Q. Mr. Finch, I understood you in your direct examination to say that all of the gouges with the exception of this last described, in the Pyle, that all of the gouges shown upon your exhibits are post-mineral gouges?

A. Yes, but not upon exhibit 93.

Q. I am not speaking of exhibit 93, but upon your plan maps of section?

A. That is true, yes, sir.

Q. Do you draw some distinction from the fact that in your judgment they were post-mineral gouges, or some conclusion?

A. Yes, I think so.

1010 Q. What is the conclusion that you draw from the fact that they were, in your judgment, post-mineral gouges?

A. The maps intend to represent the facts of the existence of such gouges, and from these facts it may be concluded that certain fissures have formed and gouges have been developed across the ore and along the veins, and both of them, and that these gouges are not to be confused with the original form of the ore deposits.

Q. That is the only conclusion you desire to draw from the fact that all of these gouges in your judgment were post-mineral gouges?

A. I don't know as all of that is a conclusion. It is a statement of fact, that they exist, and that they do not conform in all cases with the ore deposition. In a great many cases they do not.

Q. How do you determine that they are post-mineral gouges?

A. By the fact that they cut the ore which existed before they were formed and the fact that they did cut the ore is shown clearly by the broken and ground up materials which are contained within

them and by the fact that they do not conform in position with the ore, indicates that they have no genetic connection with it.

Q. And one of the reasons is that you say you find these particles of ore, fragments of ore in the gouges?

A. That is one of the reasons, yes?

Q. In the typical northwest series, Mr. Finch, you find
1011 that same thing, do you not, the fragments of the ore and materials in the vein in the gouge?

A. Yes. There are usually some post-mineral gouges along every type of mineral deposit in Butte.

Q. Isn't it true of all the gouges that you find in the northwest fissures, that they have vein particles or ore and vein filling within them.

A. No, I don't think so.

Q. I want to refer you to your testimony given in the Nipper case in describing the blue vein, and in the first place I will ask you if you did not there testify that in your judgment the vein was formed,—that the blue vein fissure was a vein both before——

Mr. Dickson: What are you reading from?

Mr. Gray: I am going to hand him a copy of his testimony in the Nipper case in which he described the blue vein.

Q. Have you observed it or seen it recently?

A. I haven't seen it for twelve years, no.

Q. And I will ask you if you did not testify in that case that the blue vein fissure was a vein both before and after the completion of a fault movement along it, because of the fact that there was ore material in it which had been notably and conspicuously shattered, and that could only be done by a certain amount of movement within the vein itself? And that there were other materials where it has not been shattered which were massive for long distances and that
1012 they had been deposited since the moveable part of the vein filling had taken place?

A. Yes, that is not inconsistent with anything I am saying now. There was a fault fissure formed in which solid, massive ore was deposited therein and minor post-mineral faultings in which fragments of that ore was contained.

Q. Now, I call your attention—first, with reference to the gouge, you having produced a sample of it—page 1216—did you not testify that the gouge from the wall of the blue vein, the clay substance contained is all soft except the fragments in it?

A. Well, that is jumping over quite a lot.

Q. All right, you just read it.

A. It is a compilation of sentences out of half a dozen sentences, taking clauses from each.

Q. Would you rather I would read it all?

A. Perhaps I can read it.

Q. In the case of Hickey against the Anaconda Copper Mining Company, involving the blue vein, I will ask you if it is not true that at that time you testified that the gouge on the wall of the blue vein contained fragments of mineral?

A. Yes, and I believe that to be the case now.

Q. I will ask you if you also testified as follows:

"Q. Now, is it your opinion from your observation of the blue vein that there was a fissure mineralized throughout before the subsequent faulting occurred?

"A. Well, that is both yes and no.

1013 "Q. I am asking you for your opinion; I don't care whether it is yes or no.

"A. The fissure has to form before any ore deposition is made.

"Q. That we are agreed upon?

"A. And to a certain extent it is a fault itself; that is, it is a fault in order to be a fissure. Then this larger displacement which we find has cut the older existing things in the country is the faulting subsequent to that first fissure." I think I will skip the next.

A. Oh, read it all, read it all.

Q. I will repeat:

"Q. That does not answer the question.

"(Question read.)

"A. I don't believe we have any means of determining the age one way or the other before we know whether it is mineralized throughout.

"Q. What did you mean when you stated to Governor Thomas that you believed this to be mineralized before the subsequent faulting occurred?

"A. I said I believed it to be mineralized before the conclusion of the faulting or something to that effect.

"Q. You then think there were two processes in operation, first the deposition of ore going on at the same time the slow movement of the faulting was going on, was that it?

"A. It might be at the same time or alternating intervals,

1014 and I believe it represents pretty closely the process which takes place in the deposition of any fissure vein.

"Q. But was it at the same time or alternating intervals or subsequent to the movement?

"A. Either both or all, I think.

"Q. Oh, you ought to be more definite than that.

"A. No, I could not; I mean just that, that the motion takes place at intervals along the whole history of the movement, and the ore deposition takes place as soon as the first fissuring and down to the present time.

"Q. Was the Original fissure caused by a fault fissure, so called?

"A. It would not be a fissure to any great extent unless it were a fault fissure, so it was undoubtedly a fault fissure.

"Q. That is the Original fissure?

"A. Yes.

"Q. Now, was it mineralized before any subsequent movement along the fissure took place?

"A. That is entirely uncertain; it might have been and might not.

"Q. What is your judgment upon your examination of this mine about it?

"A. I merely mean to say that there was ore deposition before the fissure was finished, and that it shows by the structure of the ore itself that is broken up in fragmental form that there has been movement and disturbance along it. That was the disturb-
1015 ance of the fault, that there has been other ore deposited which has not been disturbed, and as a consequence it was probably subsequent to any considerable faulting.

"Q. But your conclusion is that it was partly mineralized before the faulting was completed, and then subsequently mineralized?

"A. Yes."

Q. Is that correct?

A. That is correct, and as far as it applies to anything in connection with this case, it would be as good a statement as I could possibly make upon the blue veins of this area; but the veins which I have been describing as the Black Rock and Elm Orlu vein- have different characteristics.

Q. Did I understand you to say that the fissures in which large veins are deposited are necessarily fault fissures and must be fault fissures?

"A. In which fissure veins are deposited; if the vein is of any consequence or extent; they are fault fissures before the veins are deposited." Is that what you testified?

A. Yes, and that means that a fissure has to form and has to have enough displacement along it in order to be an open fissure, that the solutions may travel through it. It may not be as big as the blue vein; it may be a fissure of slight displacement, like the Elm Orlu and Black Rock.

Q. Then how are we to distinguish the fault material that you find in a typical fault fissure, that is, these fragments of ore
1016 and mineral in the gouge, and what you contend is the post-mineral gouges?

A. That is easy enough to determine.

Q. How?

A. If it is a fresh gouge containing as mineral matter or ore only fragmental material, and is not replaced,—the substance of it is not replaced by new mineral, since the fresh gouge was formed, then it is post-mineral. Lacking that replacement or substitution of the gouge by new mineral matter, it is post-mineral.

Q. If you found it replaced in a number of places, are you willing then to say that it is not post-mineral gouge?

A. If we find it not replaced in all places developed, the conclusion is quite obvious that it is a post-mineral gouge.

Q. Now, if you will kindly answer the question.

(Question read.)

A. No, I would not say it is a post-mineral gouge if I found it replaced in a number of places, but where I find it not replaced in all places I do say that it is a post-mineral gouge, and the reason I

say it is a conclusion to a certain extent is that no vein in the world is ever totally developed throughout its entire extent in any mine.

Q. Do you say that the gouge of the Jersey Blue vein as it is developed in all places, that in all places in that gouge there is no mineralization of the gouge or replacement of it?

1017 A. I do say that I find no exception to the post-mineral character of the gouge which I have represented in blue upon defendant's exhibit along the north wall of the Jersey Blue or Black Rock vein.

Q. If it could be developed or was shown that that gouge in places was replaced, then in your judgment it would not be a post-mineral gouge?

A. Then it would not be the gouge to which I refer.

Q. Will you answer the question?

A. That is precisely what I mean; it would not be the gouge that I am referring to, in these post-mineral gouges along the wall. There are certain lines transversing through the stopes, and running in various directions, in which there was an old fissuring, and in which gouge may be found partly replaced, but not along the gouge I have described.

Q. (Question read.)

The Court: I think you have not answered the question; you are simply saying that that is not the gouge.

Q. I asked you if this gouge along the Jersey Blue vein as we have called it should be found to be replaced in places, would you then say that it was not a post-mineral gouge?

A. Yes; if specimens were taken of precisely the gouge I am talking about, I would say so.

Q. Let's get some of these maps so we will understand each other. If you should find the gouge along the Black Rock tunnel

1018 or the 450, these gouges that have been described as forming the walls of the Jersey Blue—if you should find them replaced in places, would you then consider that it was a pre-mineral or preceded the mineralization of the fissure?

A. Yes, but I haven't found it so.

Q. Well, I am not asking for your observation just now. Now, that is true all the way through these properties, as I understand it, except where you have made exceptions in your testimony. It is your desire to be understood as classifying these gouges as post-mineral, Mr. Finch?

A. As far as they are represented upon the maps, yes.

Q. All right. Go to the Elm Orlu 1700, the place which our witnesses have given it as their opinion that the Jersey Blue vein is developed, and in connection with that examine Sample W-4, taken from there, and say whether or not that is a post-mineral gouge.

A. Yes, I think it is. It does not exhibit the gouge as a matter of fact very much, but it will be seen on the surface of the specimen, which represents the side of the vein, that the ore minerals in it have been scratched and smoothed out by a movement since they were formed, showing the post-mineral movement.

Q. Yes, but your materials that you say have been so marked are in the gouge, aren't they?

A. Broken up and ground in the gouge, yes. The reason that the gouge is black is because there are sulphide minerals that
1019 have been ground up into it.

Q. Isn't that gouge on that sample?

A. Yes.

Q. And replaced gouge, all through it evidence of replacement visible to the eye?

A. Oh, yes; there is a deposition of ore along the little fissures. Here is the development of a post-mineral clay, in which the ore materials are ground up.

Q. And that is what you want to be understood as describing—in post-mineral gouges you are not describing anything like this band of vein matter—on W-4 you say that is not replaced gouge?

A. I did not say that; I said it is not the post-mineral gouge. It may be replaced gouge, and probably is, from a later period, but there is a post-mineral gouge represented here also.

Q. What thickness of the gouge is it that you refer to as being post-mineral?

A. It has almost all fallen off of this specimen in bringing it into court. You go underground and you find a quarter of an inch or so of soft clay on each side of that little vein or stringer.

Q. Now, let us measure this on the side where this W-4 mark is, and see how wide that replaced gouge is which you say may be pre-mineral?

A. It is undoubtedly pre-mineral gouge.

Q. How wide is it?

A. It varies from half an inch up to an inch or a little
1020 more. They are things of a totally different character and period.

Q. In other words there has been some post-mineral movement along that line of fracture or along that fissure?

A. Yes, and that is quite the customary thing.

Q. Will you pull down the map which shows the mill tunnel, Defendant Exhibit 66. There was a drift on there from the mill tunnel that is not shown on the map. Have you examined it; it runs from station 1111?

A. Running southeast?

Q. Yes.

A. Yes, I have examined part of it.

Q. In which direction does it run and how far?

A. It runs approximately in the direction that that red line indicates.

Q. How far?

A. I didn't measure it the last time I was in there.

Q. What is its course?

A. About as that red line shows.

Q. Well, what is that?

A. That is about south 75 east.

Q. How far does it run?

A. The last time I saw it I think it was in about 40 or 50 feet, and still going.

Q. From station 1111?

A. Yes.

1021 Q. Will you just describe what it was following?

A. It was following a very small vein.

Q. How small?

A. Ranging from a foot down to two or three inches of vein matter, with some alteration, mineralization of the granite besides.

Q. Have you your notes on that?

A. No, I did not take any notes. I am speaking from recollection of it entirely.

Q. What was the kind of the vein matter?

A. Quartz.

Q. And how wide would you say was the quartz?

A. Quartz and other vein matter I think as much as a foot.

Q. How wide was the quartz?

A. About a foot in the region where it starts out, and it looks like an excellent vein matter there too.

Q. How much vein matter besides the quartz?

A. Including the mineralized granite there was a good deal.

Q. Just what you call vein?

A. More than the width of the drift.

Q. You consider that all vein?

A. Yes, vein in the sense that mineralized granite is vein, or as it has been shown in a good many places on these exhibits.

Q. How much vein material besides the quartz?

A. Well, including the mineralized granite, there is a good deal.

1022 Q. I just want what you call vein?

A. More than the width of the drift.

Q. You would consider that all vein, would you?

A. Yes, vein in the sense that mineralized granite is vein material and it has been shown in a number of places on these exhibits.

Q. I just want your own judgment?

A. Yes.

Q. You say then that the vein is wider than that drift running from 1111 southeasterly?

A. Yes.

Q. You have a number of drifts from the mill tunnel or from that crosscut where it shows as a drift, from the mill tunnel westerly?

A. Oh, yes, I have a number of them.

Q. All right, let's get these next and I am going to have you describe their workings; just go on, Mr. Finch?

A. Starting at the mill tunnel, crosscut survey station 1093 there is a very—a little individual vein, as I have already described, one of the branches of a larger vein which is about——

Q. If you will just give us the size, course and dip of these. At that station what is the size, course and character of the dip of this vein?

A. The course where it starts out is almost due east and west and dips to the south.

Q. At what angle?

A. Eighty-five degrees.

1023 Q. It is how wide?

A. Six inches to a foot wide.

Q. And made up of what kind of matter?

A. Mostly of quartz as I recall, some manganese.

Q. How far is it followed according to your notes?

A. It is followed continuously back to the old stope region.

Q. What was shown as you went along the drift as you call it?

A. A vein was shown with customary variations of width and strike.

Q. The same vein all the way?

A. I think so, yes.

Q. What is this little red line that you have running in a southeasterly direction from a point approximately forty feet west of the beginning of this crosscut or drift?

A. It is another branch of the stock work that shows both there and in the crosscut.

Q. Does it show on both walls of the drift at that place?

A. I have not so noted it there, no.

Q. What is its course?

A. Its course is about south seventy east.

Q. Is that from recollection or have you some notes from actual observation?

A. I have actual observations here which were mapped as accurately as I could do it underground, on a map made by sur-

1024 vey, and that was about the direction of strike.

Q. And you did not observe it on the north wall?

A. Of the workings?

Q. Yes.

A. No, I did not.

Q. Did you look for it?

A. I looked pretty carefully there.

Q. Any gouge there?

A. On the north wall?

Q. No, not on here, but on the drift—no, I want to get your own notes, what you are testifying from?

A. My own notes are just like that map.

Q. All right then. Is there any gouge shown on your notes?

A. There is a little gouge shown slightly farther west but I didn't note any at that point.

Q. I am asking you at the point where this vein appears to be drifting to the north?

A. I didn't observe any at that point.

Q. I note you have it marked on the map. Have you that in your notes?

A. Yes, sir.

Q. What is the direction of that gouge given in your notes?

A. That is co-incident with the vein which I first described where it starts out on the drift.

Q. How far did you follow that gouge?

A. Well, followed it as a distinct gouge up to the branching
1025 of the other little vein which runs south 70 east.

Q. What becomes of it there?

A. I don't know; can't tell what becomes of these gouges usually.

Q. What is this you have shown above station 1109 going out of the north side of your drift?

A. That is another little individual veinlet of the stock work system.

Q. And what is its course?

A. Its course, as I have mapped it is about north fifty-five degrees west.

Q. And then what did you follow from where it left the drift above 1109 to station 1110?

A. The same little individual vein that we started in on the drift.

Q. All the way from station 1048 to station 1109 were you on this vein?

A. I think so.

Q. Any gouge in there?

A. No, I don't think so. Not following the east and west one.

Q. Following in the drift I say?

A. No, I don't think there was, to speak of.

Q. Now, then, at 1110 you have got another little veinlet coming in on the south side and going out on the north side?

A. Yes, we have one in between that that has not been mentioned.

1026 Q. Well, I think we have mentioned that, haven't we?

A. You only mentioned the first one—1109, yes.

Q. Now, at 1110 you have another one coming in at the south side and going out at the north side?

A. I don't know as you can speak of that as the same thing that goes out on the north side.

Q. How is it shown on the map here?

A. It is shown as the stock work, in which several things interlace.

Q. It starts out from the same place it seems to be entering the drift, doesn't it?

A. Very nearly, yes.

Q. At station 1110?

A. Yes.

Q. Any gouge there?

A. I think not.

Q. What do your notes say as to the size of this little veinlet?

A. They don't say anything.

Q. Its course?

A. But I would state that it is about six inches wide.

Q. Its course?

A. Its course is about north 60° west.

Q. And this six inches is made up of what material; what do your notes show?

A. Well, I have mapped it as if it were solid vein material. That is indicated quartz and manganese—quartz and manganese
1027 very likely from the nature of my notes.

Q. Coming down on westerly to station 1111 have you some gouge there—in your notes, just what you observed?

A. That is what I am giving you.

Q. All right, just give that if it is there?

A. I find there another vein, branching segment of the stock work extending northwesterly.

Q. Find a little post-mineral gouge there too?

A. Yes, quite distinct.

Q. And that little post-mineral gouge is going in what direction?

A. Along with the vein material.

Q. How far does it follow the drift, the gouge?

A. The drift now runs out to daylight. The position of it—I haven't had a survey of that clear to daylight.

Q. Doesn't it follow on westerly here before it goes to daylight?

A. This looks like a reasonably correct mapping of it.

Q. You follow that gouge that you have just spoken of out to daylight?

A. No, we follow through the work out to daylight; the gouge runs off to the side.

Q. Off in what course?

A. About the course it started on, northwest.

Q. And about as mapped on plaintiff's exhibit 9?

1028 A. Yes, except we don't know where it goes to beyond the end of the working, except that it appears to correlate with a small link or strand from the Niagara vein.

Q. Yes. That gouge cuts off the vein material at this station-1118 and 1119, doesn't it?

A. No, follows the vein material.

Q. Follows the vein material?

A. Coincident with it.

Q. Any interruption of the vein material in the two sides of that gouge; any displacement—no, from your own notes, just from your own notes, your own observation?

A. I am giving you my observation.

Q. All right?

A. From the point where the vein material and the little clay slip passes out on the west side of the Daylight crosscut, the gouge material follows along the northwest veinlet or strand into the main east end west drift. There this particular veinlet united with another of a similar nature running east and west. Where the Daylight crosscut and the drift come together there is some little dislocation by the fault slip but not enough to destroy the continuity of the east and west part of it—or the north and west part of it.

Q. In other words, the vein is not displaced so that the—so that some portion of it is not directly opposite another portion in that drift?

A. That is as I have mapped it.

1029 Q. According to your idea?

A. Yes.

Q. Now, from station 1109 to station 1110—no, from 1110 to station 1119, isn't it a fact that it is all—from station 1110 to 1119, isn't that—detailed on plaintiff's exhibit 9—isn't that entirely in granite?

Mr. Dickson: Mr. Gray, may I make this suggestion? Isnasmuch as there is a possibility of some difference in station numbers I would suggest that you refer to the station numbers given on our own exhibits?

Mr. Gray: It is so clear here I want to use this one.

The Court: Of course the witness must always make himself certain of what point is being inquired about.

Mr. Gray: From station 1110 to station 1119, except as you come to this northwest fissure, isn't it all in granite?

A. No, there is one northwest strand which is omitted from plaintiff's map, and another one which follows along the drift.

Q. We have gone over that?

A. It is between—it is above the lagging of the drift and you have to see it only at points through there, but I believe there is a continuous quartz veinlet there.

Q. Mr. Finch, you have projected through to the end of this so-called Daylight tunnel on a small vein curved over into the
1030 Niagara tunnel, a strand of red. What is there between that which justifies you in making that projection?

A. Oh, that is dotted and shown to be hypothetical; just merely to indicate that that is the greatest probability, there having been other drifts developed of a similar nature.

Q. The width of that little strand there as you have it at the south of the Daylight tunnel is what?

A. Daylight crosscut, you ought to call it.

Q. All right, whatever you call it; Daylight crosscut.

A. It doesn't go to the south.

Q. Well, where it passes out of the wall?

A. I should think there was a foot at least of vein matter there.

Q. How far did you project it there in order to get it on a curve around and show it was the same vein?

A. We say——

Q. Just a minute.

A. Through a space of about 150 feet. We assume it corresponds to something of the vein material on the Niagara.

Q. At the station- 1107 and 1108 there is a northwest fissure, is there?

A. I can't find that northwest fissure so very distinctly.

Q. Why do you show it on there then?

1031 A. Largely because there seems to be a jogging in the ore bodies from the south towards the north there, but I wasn't sure whether that was a case of faulting or one of those cases of the original footwall of the Black Rock vein. It might be either.

Q. However, you do show it upon your exhibit 66 as a fault slip, don't you?

A. I might state that I did not personally put that on.

Q. You don't care to be responsible for that—all right.

A. If you care to have me do it, I would be glad to have the judge see my notes on that; all taken underground.

Q. I am not questioning that; if you disclaim responsibility that is all that is necessary.

A. I did not myself put a fault fissure in my notes along that point.

The Court: You have said you didn't see it.

Mr. Gray: Now, between 1108 on plaintiff's exhibit 9, a station which is not marked on the exhibit 66 but which is nearer the point last indicated, you have some of these cobweb or horse-tail veins depicted?

A. Yes.

Q. Extending in what direction; what is the course?

A. Oh, about seventy-five degrees west.

Q. Extending from there over to the Niagara tunnel, to the north branch of the Niagara tunnel?

1032 A. Yes.

Q. Where did you get the observation from which you placed courses for these various veinlets, as you call them, upon the map?

A. The norther-most of the veinlets to which you refer has, in the Niagara tunnel, a drift upon it a sufficient distance to give a direction. The southernmost of that series has a considerable stope upon it which I have entered for a distance of sixty or seventy feet along the direction indicated upon the map. It is a stope from which apparently ore had been removed.

Q. Now, from your notes at station 395 or near there in the Niagara tunnel, what is the course of that strand, from your notes?

The Court: Haven't they the same stations on their maps?

Mr. Gray: Yes, your honor, wherever there is a station marked, but there are some stations that are not on their map which are on ours.

A. Station 395?

Q. Yes, sir, the course, according to your notes?

A. North 75° west.

Q. Is that the course that is shown on your exhibit 66?

A. Exactly.

Q. That was placed on there from your own observation?

A. Yes. I think that particular thing was.

Q. Now, then at 396 is there another little strand—what is

1033 the next strand—what do you next show now—how far is it following in a southeasterly direction to the next strand, according to your notes?

A. Well, the notes are identical with the map.

Q. I want your notes.
A. In that region?
Q. Just give me the number of feet to the next.
A. Across that entire system to the one which is stoped?
Q. No, I beg your pardon, Mr. Finch, to the next one which you have chosen to give upon the map and give a course to.
A. Measuring along the drift it is 25 feet.
Q. And what is its course?
A. North 75° west.
Q. Is there a station there?
A. Not on my notebook, no.
Q. What one is that here?
A. It is the third one shown there.
Q. Why did you put this on the map?
A. You must remember there are other engineers and geologists in this case.
Q. You don't care to be responsible for the other two there?
A. I think they are very likely to be there.

Mr. Gray: I want an answer to the question.
The Court: I suppose the question should be whether he saw them there.

Mr. Gray: Yes, did you see them there?
1034 A. I have noted this one and this one, but I have also noted it is a general condition of branching towards the southeast.
Mr. Gray: But you have not observed or taken the course of the two in between, that you indicate there?
A. That isn't two; that is one.
Q. All right, the one?
A. No, not in my notes.
Q. Now, the next one that you show in your notes is where?
A. Is the one which shows in the drift as what used to be an old stope, just south of station 404?
Q. As it is expressed in the drift and shown on here in the drift what is its course as shown in the drift?
A. I am going to state the course of that vein from my knowledge of the——
Mr. Gray: Mr. Finch, if you will just answer my questions you will have every opportunity to explain. What is the course as shown on this drift from the Niagara tunnel on the map?
A. On the map?
Q. Yes, sir.
A. That is about north 85° west and shown within these limits.
Q. That is as near as it is observable upon that level?
A. It is as near as you can observe it.
1035 Q. Whereabouts did you observe it?
A. As I have already stated, in a long stope which was inaccessible in the early part of my study of the mine but accessible now.

Q. Lying where?

A. Lying southeast and extending out as a part of the drift now still accessible, but extending beyond the point indicated in the direction shown.

Q. You don't make mention of the veinlet or strand that is also shown on here between 396 and 404, do you?

A. Yes, I have got that represented as the——

Q. You dispute that?

A. I have got that represented as a small mass of vein matter.

Q. In your notes, have you?

A. Yes, including the strand shown north of 396 and one just south of 396, and one comparatively small vein.

Mr. Dickson: Shown in your own notes?

A. Shown in my own notes, yes. They don't differ radically from the representation there.

Mr. Gray: By the way, Mr. Finch, in your direct examination in connection with this mill tunnel, this little fissure that we find with a northwest and southeast course, you called east and west fissures or veinlets. What was the reason for that?

A. I don't know that I understand what you mean.

Q. This over in the mill tunnel, the ones that I asked
1036 you about, that course north 75 and north 65?

A. I gave you the direction of them.

Q. Yes. Yesterday on your examination you referred to them as east and west fissures, or east and west veinlets?

A. I referred to the veinlets following in the drift as east and west veinlets, and the others as having a northwest direction, connecting them into the stock work.

Q. What is this, the vein shown on section 54, marked the Raymond 52 and Raymond 100?

A. That is development work by the lessees on the Niagara.

Q. A part of the large lode that we have been discussing?

A. Yes, part in the sense that it branches more or less separately towards the south, but unites deeper in the mine.

Q. That is the portion of it that goes through the north side line of the Black Rock?

A. Yes, sir.

Q. I asked you this morning concerning the development which you had directed for the purpose of ascertaining these facts and you spoke first of the raise to the surface in the Jersey Blue. What other early work did you do or cause to be done?

A. Well, I don't know that I can say independently that I caused a great deal to be done.

Q. Well, what was the early development work then?
1037 About the first, wasn't it, was the work over at the Elm Orlu discovery with the idea of attempting to carry the discovery vein of the Elm Orlu through the north and south side lines, wasn't it?

A. Well, it was either that or the extension of drifts along the Black Rock vein in the Black Rock. I think they were done about the same time.

Q. When was it that you saw the work along the Elm Orlu discovery, both northwest and southeast therefrom, as it shows upon the exhibit?

A. When was it?

Q. Yes.

A. I saw it while it was in progress.

Q. When was that?

A. I don't know as I can tell you. I haven't put it down in my notes.

Q. It was a year and a half or more ago?

A. Oh, yes. Oh, in answer to your former question some of the very earliest work was the driving of crosscuts on the 400 foot level to open up the Black Rock vein. That was earlier than either of these others.

Q. This, however, is a year and a half or two years ago, the work at the discovery?

A. Oh, yes, quite a considerable time ago.

Q. Much of the earlier working done was also on the Black Rock tunnel level?

A. Yes.

Q. Now, then, in developing the Jersey Blue vein in the
1038 Black Rock tunnel level, from what direction was it developed—first, from the tunnel itself, wasn't it?

A. Yes, from the Black Rock tunnel.

Q. And westerly therefrom and easterly therefrom?

A. Yes.

Q. What was the first work, easterly; just show the court chronologically how you developed this network of——

A. The first work easterly was along the north wall of the Jersey Blue or Black Rock vein as we call it, following up from station 775 through 786, 799 to 800, in which the several slightly faulted parts of the north wall of the Jersey Blue vein were located. Then following easterly from the 800 a very small veinlet, being the northermost of a series constituting the Black Rock vein, was followed back into its junction with the Niagara part of the vein. Then the drift was continued easterly and around the discovery point and drifted out to Daylight.

Q. That was the way you developed that, was it?

A. That was first, and then afterwards there were crosscuts run clear across the whole stock work of the vein.

Q. Now, just come over to this map where there is not quite so much of these little squares and stock work and we will follow it a
1039 little more intelligently. The first development you did to the west stopped at station 831 and followed along next on the east——

A. We didn't stop; kept on drifting.

Q. All right, I will withdraw that. You kept on drifting?

A. Yes.

Q. Past station 775 and up to station 786?

A. Yes.

Q. At that point you were not able to follow any definite slip or fissure, were you?

A. Yes.

Q. Why don't you show it on your exhibit 65?

A. Naturally couldn't follow it straight through a strand of the Deadwood vein, but a very short crosscut of only four or five feet picked up the vein seen there and drifted upon it in the drift shown at station 787.

Q. Then from station 786 you then went up and followed through station 787?

A. Yes.

Q. And there again you were not able to follow this little fissure any further?

A. There again we struck another strand of the Deadwood vein, as already stated, and went on beyond and picked up the faulted segment of the Black Rock vein again.

Q. You say you came back and started another working from 786 and ran up to——

A. We ran across in crosscut form from what is marked 199 on your map over to 800.

1040 Q. First from 786, didn't you?

A. Yes. In that crosscut up to station 800 where the vein slightly dislocated a particular individual little vein forming a part of the stock work was developed as shown and is indicated upon the defendant's map, not upon plaintiff's map.

Q. From 799 to 800 you had vein matter—you had a vein how wide crossing?

A. We had vein matter all the way.

Q. Well, how wide—how far—what course is shown to that vein; is that shown on your own map?

A. That shows developments but the width is something like twenty feet at station 799, made up of the stock work testified to.

Q. You have a direction in all the little veinlets. What is the direction?

A. That I think is the intention——

Q. You don't want to be responsible for that?

A. I want to state right now that should be represented from 799 to 800 precisely as it is on both sides of it.

Q. And you don't care—that is all right.

A. It is not the fact that there is such a definite vein structure but there is a stock work there.

Q. Then you can make—you found two other little northwest slips in there, didn't you, which you say are parts of the Deadwood fault?

A. Yes, one of them at least. The other does not seem to

1041 be a fault of so much displacement in that drift.

Q. Did this strike of the Deadwood fault displace the vein appreciably in these drifts?

A. Oh, yes, shown upon the map.

Q. What is the justification for showing the displacement of this

stock work that you have just marked on the map on both sides of 799, as you have displaced it there?

A. We have the drift north on both of the veins.

Q. Where?

A. Shown at station 800 and shown in drift 787.

Q. How do you project it on westerly to this other strand if it is only a stockwork and has no definite course?

A. I stated that to project that there is a definite fissure vein on the north border of the stock work. That definite vein is displaced.

Q. Is that the vein at station 800?

A. Yes, it is.

Q. On your notes let us see what its course is and its dip?

A. Its course is as nearly as possible due east and west.

Q. And it dips in what direction, according to your notes?

A. About vertical; that is my recollection; I did not note the dip.

1042 Q. How far is it followed along there according to your notes?

A. It is just shown at station 800 where the cross cut develops it.

Q. Oh, you take the course across the upper end of that little cross cut?

A. Yes, certainly.

Q. Then you encounter another; did you then drive on past station 800 to the east?

A. Yes.

Q. Immediately, that was the first work you did from this cross cut?

A. Well, at least that was done in the interval between visits of mine.

Q. Now, you come back then, and you drove two little crosscuts from this drift southerly, didn't you, at station 785 and at a point some 20 feet beyond?

A. Those were not the first.

Q. Which was first?

A. My recollection is that crosscut 8 and 9 were first.

Q. What are they?

A. Well, you have different numbers. It corresponds to our seven and a crosscut extending to the south from crosscut seven.

Q. Well, eight and nine were driven—what did 9 develop?

A. The granite in the wall.

Q. That is this one here, your No. 7?

1043 A. Yes.

Q. You have some veinlets in there?

A. The customary little veinlets.

Q. Do you consider that in the vein?

A. No, that is fresh granite.

Q. Now, going south on your crosscut without number, you then crosscut southerly?

A. Yes.

Q. How far at that point?

A. From the drift?

Q. Yes, from this drift that we have been speaking of that run from 800 easterly?

A. I don't know that the work in crosscut No. 8 was done continuously, but it was done at a certain time when I came here, at any rate.

Q. What was the purpose of this development that you have referred to here of driving this second drift from Station 836 easterly, pointed all the time toward the discovery shaft of the Black Rock?

A. That was merely to show up more of the stock work of the vein, which could not be shown in a single drift.

Q. Well, following along that, what did you start to follow; gouge, didn't you?

A. Vein matter and gouge both.

Q. And did you follow them continuously?

A. No.

Q. Just describe what it did follow?

A. Oh, that drift develops a series, a number of things; I
1044 think it is full of little fragments of stockwork, vein deposit, running in there, in a great variety of directions, which might be shown upon this map, I suppose, in greater detail, but nevertheless they are there. The drift shows a number of post-mineral slips, and some of the slips of the Deadwood, but it does follow continuously in stockwork material.

Q. But to that point you follow a gouge that went out in the north side of that drift just about at station 1114?

A. Yes.

Q. Did you follow anything from there over to where you get into a little vein showing there about 20 or 30 feet out?

A. Yes, we follow lots of vein matter.

Q. What kind of vein matter?

A. Quartz and manganese mostly.

Q. Is that what you get the course from in that working between the point where this gouge passed off on the north wall and the point 20 feet beyond where you strike northwest fracture?

A. Yes, you can take the course locally.

Q. What is the course between those two points?

A. Pardon me; you can take the course locally of the individual little lines of stockwork, but they do not extend any great distance in their own direction, they meet others and interlace with them and join with them.

Mr. Dickson: I want to call attention to the fact that
1045 Station 1141 is not on the defendant's map and the record will be confusing unless my friend will be careful when he refers to his own map to say so.

Mr. Gray: I will be careful. He might mark the number on this map.

Q. There is the station there with no number apparently; from your notes have you any observation there as to the course from Station 1114 to the point 20 feet beyond where you strike the northwest fissure?

A. The course is about as shown on both maps, of a definite vein of the stockwork system.

Q. How wide is that vein in that drift between those two points?

A. Oh, several inches wide.

Q. Isn't it solid granite in there?

A. No, it is not solid granite in there; it is highly altered granite, full of quartz and manganese, which anybody can see.

Q. Then you drove over with this drift from 1114?

A. Yes.

Q. Till you came to the north wall of what you call the Niagara, and what we call the Rainbow lode?

A. Yes.

Q. After that work was completed by you do you recollect that the Elm Orlu Company continued the Black Rock tunnel drift southeasterly?

A. Yes.

Q. From Station 831 approximately southeasterly to Station 1052?

1046 A. Yes.

Q. What did that follow?

A. That followed a fault gouge transversely across all the ore and vein structure shown in the walls of the drift.

Q. With fault gouge on both walls?

A. Oh, it is an indefinite fault fissure; sometimes more than one plane of faulting, as indicated by Exhibit 65; but when we got down to the mouth of crosscut 19 in that region it branches through a series of fault planes, and swings around into the southerly end of crosscut 7. There are a great number of little fault branches.

Q. Then they continued on through the Black Rock fault and what you call the Rainbow vein?

A. Yes.

Q. And are developed through—what do you call this drift here?

A. Drift 25.

Q. Through what is called drift 25 you developed another gouge, did you not?

A. Well, several little gouges grouped together, yes.

Q. And as I recollect this morning you had a pointer in your hand about an inch thick, and you said the gouge was about that thick?

A. I was not referring to that gouge.

Q. What is the width of the gouge in that drift then?

1047 A. There are several little gouges there that probably may be related to each other in some way, but they have rather devious strikes.

Q. What is their width?

A. Oh, the individual width is a fraction of an inch in each instance?

Q. Any vein material in them?

A. Some scattered vein material.

Q. What is the width of the vein in 25?

A. I don't think there is any vein there, except that little border

zone of stockwork, interlacing quartz seams in the country, and they are all related to the Black Rock-Elm Orlu vein.

Q. Now, is there any quartz in that veinlet?

A. Quartz of that type, yes. It is not a veinlet; it is a series of little seams.

Q. Between those little seams what is the width of the quartz that you saw in there?

A. The quartz does not exist between the seams, it is in the seams themselves. Then besides the little quartz seams are unconformable little clay seams in the drift.

Q. Post-mineral faults?

A. I think they are, yes.

Q. Now, in No. 4 crosscut from the Clark tunnel, what is shown in there?

A. There is shown a rather definite gouge slip in *in* there.

Q. And its course?

1048 A. Its course is——

Q. Didn't you take it on your notes, or did you just plat it?

A. It is platted on this map as I took it underground. It is north 65 west.

Q. Anything else in there besides that gouge? How large is that seam of gouge?

A. Oh, I should say an inch or maybe two inches.

Q. Any vein material outside of the gouge?

A. Yes, there is some vein material.

Q. What is the width of the entire vein there?

A. There are points where the vein material that is more or less coincident with the gouge and with other little stringers of vein material in the country, where there would be several inches of it. Ordinarily it is narrower than that.

Q. What would you say the maximum width of the vein matter is in that No. 4 crosscut from the Clark tunnel?

A. Oh, the very widest piece of quartz that I saw would not be over six inches.

Q. And its average width through there?

A. It would be pretty hard to average.

Q. What is its dip?

A. Its dip is to the south, or nearly vertical.

Q. And did you attempt to project that and correlate it with anything that you found in any of the workings northwesterly?

A. I did not attempt to correlate it with anything shown

1049 in working 25, because this is a rather definite little fissure, and would appear to pass northwesterly, south of the working No. 25. It is much more definite and dependable than the showing in drift 25.

Q. Will you get down the 450? Before we pass that Clark tunnel, is that crosscut open today?

A. Oh, yes.

Q. Isn't it true that in that crosscut there is a vein shown containing eight inches of quartz and 18 inches of gouge, the one that you have described as having a maximum width of six inches?

A. That is my best recollection of it. I do not deny that there

is considerable vein matter there, but I do say that there is not eighteen inches of gouge. There is 18 inches of softened and rotted granite vein material perhaps, as is customary along near the surface.

Q. It is open where it can be seen and determined who has properly reported on it?

A. Yes. It is a definite seam with some definite mineralization.

Q. Now, the 450, in working 456 I want you to describe what is shown in that working from your notes?

A. That will be a reiteration of what I have already said.

Q. That is one place where I want a reiteration. That is still open where it can be observed, isn't it?

1050 A. Yes, or it was when I was up there a few days ago. That drift is driven from crosscut 451 in a northwesterly direction, starting upon a gouge slip which shows in the floor in the south side of the drift in the beginning of the drift.

Q. Near station 1138?

A. Yes. It follows in about the same relation along the drift to within 25 feet or thereabouts of the end of the drift, at which point it bends in a sinuous way over to the north side of the drift, and then curves around very sharply into one of the branches of the Black Rock fault.

Q. Does it coalesce with it?

A. With the fault, yes.

Q. Isn't it a fact that it comes right up against the fault, and you can see it cut off by the Black Rock fault?

A. No, you can see it bending into the Black Rock fault.

Q. Now, then, give us the width of that at the station 1138 or near there where you observed it?

A. I have it noted as a mere seam of clay.

Q. And that is the one that you pointed out; the one as being just as wide as your pointer, about a quarter of an inch?

A. I think that would fairly represent it.

Mr. Dickson: That pointer is more than a quarter of an inch.

Mr. Gray: Well, perhaps it is.

A. (continued). Those seams vary all the way from a 1051 mere meeting of two surfaces, smeared with clay, up to places where the granite is softened up to a width of two or three inches.

Q. Do you mean to say in that working that the vein is not exposed from 18 inches to two feet in width of quartz and gouge?

A. I did not find any such thing in there until we got to the south wall of the vein.

Q. It is open where it can be observed?

A. It is.

Q. Have you noticed any striations or grooves on the north wall of the Jersey Blue vein?

A. Yes, I have at various places.

Q. Where?

A. I don't know that I could point out any particular place, bu
they are quite a customary thing.

Q. Haven't you a memorandum of some places where you mad
some such observation?

A. I might find it if I reviewed quite a good many sheets of m
note book.

Q. Have they a general direction and dip?

A. Yes, they dip rather flatly toward the west in the plane of th
vein.

Q. Do they dip sharply or flatly?

A. They dip rather flatly.

Q. About what angle?

A. In both the gouge of the Jersey Blue-Black Rock vein and i
Black Rock-Elm Orlu branch they have quite a similar dire
1052 tion of striation, but in that matter of striations, you will fi
different directions of the striation in some places, due
some local cause. The statement which I made is a generalization.

Q. But that represents the general condition as you have observ
it?

A. I think it does, yes sir.

Q. There is another one of your drawings here that I wanted
refer to, it does not seem to be marked with any number.

(Drawing marked Defendant's Exhibit No. 94.)

Q. This Exhibit No. 94 was exhibited by you to show how t
hanging wall was more regular than the foot wall?

A. The south wall, yes.

Q. According to the explanation that you gave, the hanging w
of all veins would be less regular than the foot walls?

A. That is generally the case in veins that are not highly dev
oped fault veins.

Q. The 1400 Black Rock, have you a sketch in your notes of cr
cut 1416?

A. No, I have not; that crosscut has been filled since I have b
in there.

Q. You have no observation of it?

A. No, I have not; it has been completed since I was in the m
last.

Q. Have you a sketch of 1406?

1053 A. That has been closed during all the period of my st
of the mine.

Q. Who is responsible for the geology that is put on there, so
one else than you?

A. Others who have seen it, yes, sir.

Q. Now, about this horsetail structure and cobweb structure
the Black Rock 1400 and the Elm Orlu 1500?

A. In the stopes above the 1400?

Q. Yes, the 6th floor above the Black Rock 1400?

A. That is about 40 feet above the Black Rock 1400.

Q. Do these matters which are shown upon this exhibit represent actual observations?

A. Yes.

Q. Made by you?

A. I think they do, as far as they are drawn in the actual workings. They are made by me or by somebody connected with the study of the case.

Q. Now, get your notes if you please of this, commencing at the Elm Orlu shaft and going northerly; this first working here which is about at the point 1501, the first lines represent what is called the copper vein?

A. Yes, I believe they do.

Q. It has nothing to do with this vein that we are considering?

A. No, no.

Q. The next one——

A. I am not so sure whether it has or not, really; I am not
1054 sure but what that does probably form part of the old east and west vein which has been adopted by this copper vein.

Q. You go up to station 3 and that is what you call the copper vein?

A. Yes, I found some copper ore there.

Q. It is what you call and refer to as the copper vein?

A. I think so.

Q. A northwest vein.

A. That is, however, another case of the ancient structure being adopted by the copper vein, which spreads into it.

Q. It is what you call the copper vein?

A. It is now a copper vein, yes sir.

Q. Do you find material or anything other than the copper vein in that drift southeasterly?

A. Oh, yes.

Q. What do you find in there?

A. On the minerals of the zinc veins.

Q. Weren't they introduced into this northwest fissure or left there before the fissure was formed in your judgment?

A. I suppose it might be so.

Q. What is your judgment?

A. I am rather inclined to think they were there before the copper minerals came in in the same place.

Q. You think the northwest fissure followed along there someway, along the old vein?

1055 A. Yes, as Mr. Winchell says, along old lines of weakness.

Q. In other words, that the zinc ores were first deposited?

A. I think that is likely to have been the case.

Q. Now, you have shown that vein crossing the drift, crossing from the Elm Orlu shaft at Station 3, and also at a point somewhat southwesterly of Station 3?

A. Yes.

Q. How many courses did you take; how many veinlets did you take the course of in there?

A. Well, it is rather a solid mass.

Q. What is the course of that solid mass then?

A. About north 30 to 35 degrees west.

Q. What was the material that you found there on both sides of Station 3, both northeasterly and southwesterly?

A. The direction of that part was about an 85 degree dip, and at Station 3 the direction on the north side in the crosscut around Station 3, it is about north 55 west.

Q. What kind of material was that right there?

A. I think there is some copper in that. It is a mere matter of recollection. I have not noted it.

Q. Did you find any aplite there?

A. Yes, there is some aplite there.

Q. Altered?

A. I did not note the fact if it is.

1056 Q. Did you include that in what you have marked as vein here?

A. Not intentionally, no.

Q. Well, did you?

A. No, the aplite as I found it there, I have written aplite in this place between the vein which is drifted upon and the vein lying to the west.

Q. How much aplite did you have in that drift; how many feet along the drift between the 85 degree dip and Station 3?

A. As shown in my notes aplite exists there for about 10 feet between the two representations of the vein, and I have not shown that as vein matter at all.

Q. Mr. Finch, this drift southeasterly from 1503 followed the copper vein, didn't it?

A. Yes, I think it did, through that space that I indicate.

Q. From station 3 to the point where it is faulted by a blue line?

A. Yes, I think it did.

Q. Where did you get the information——

A. Of course it has been difficult in some cases along this hanging wall to see it continuously; it has got to be seen from point to point, and the conclusion drawn that it follows continuously along the drift. Of course it is seen quite frequently along the drift.

Q. This horsetail that you have shown from station 4 running southeasterly and coming in again at about stations 22, 21

1057 and 25, are you responsible for that geology on there, or is that someone else?

A. No, I think my notes agree quite closely with that.

Q. Where did you get those courses?

A. I have given you the course of the north boundary or limit of the vein showing in the vicinity of station 3, which runs off and does not follow the drift there; it is beyond the drift to the northeast; then in a crosscut started from station 29 running northeasterly, quite a distinct series of horsetails are developed, and in the drift to the northwest of 29 similar veinlets very closely grouped are developed, showing northwesterly strikes.

Q. The fact of the matter is the condition was exactly as shown in Plaintiff's Exhibit No. 23, that drift No. 1503 followed the copper

vein down till it was faulted by a strand of the Black Rock fault, and you picked it up again and followed it until it went out in a sort of a curved manner through the north side of the drift, and it was again picked up, the copper vein, in that little crosscut you have referred to.

A. No, I don't think so.

Q. You don't think that is right?

A. I don't think you have shown upon your exhibits all that exists there, that is what I mean. The copper bearing ore and a good part of the copper vein apparently which has run outside the northwest of station 6, and at station 5, as shown on your exhibit. An-
1058 other good copper bearing part of that same vein which is followed toward the northwest around the region of the 1502, and in the crosscut there is a good deal of mineralization shooting across the country right here from it.

Q. Away from the copper vein?

A. I think it is all part of the copper vein, in the sense that the copper vein spreads out into the old fissure.

Q. Where is it depicted as shooting out from it?

A. Just west of the number 1502, part of it shoots off and leaves the drift.

Q. Doesn't that follow the course of the copper vein?

A. Well, it does not vary very much.

Q. Then it is not shooting off, is it?

A. In the sense that it is spreading out there, it is, yes.

Q. Do you find a good deal of zinc in this copper vein?

A. Yes, I think we do, and also a good deal of copper.

Q. Where is the zinc?

A. I have marked in the point marked 6 upon your Exhibit 23 copper and zinc and quartz, and just east of that copper vein, so that all those minerals certainly exist there.

Q. Now, following out on the northeasterly, have you this next small fracture that is shown here?

1059 A. Yes.

Q. It is shown about 40 feet from station 3?

A. Yes.

Q. What is the width of that?

A. I have marked it as narrow.

Q. Is there any gouge there?

A. A little gouge, yes.

Q. It does not show on the map, does it?

A. No; I might put it on.

Q. It is not necessary, unless you want to put it on. Is that the width of half an inch altogether?

A. I think it is more than that, yes.

Q. How much more?

A. I can't tell you.

Q. What is its course according to your notes, or did you take it or did you just plat it on your notes?

A. I took it and platted it also. It is north 48 west.

Q. Ten feet further on have you got another large broad vein?

A. No, I have got a body of aplite there, which I am inclined to think should not be represented in red.

Q. You got this aplite mixed up with your vein matter in places?

A. Once in a while; it may be somewhat mineralized; I don't know.

Q. Well, north of this little one that you had where you spoke of, passing by the aplite and some 55 feet further, have you got a small vein?

1060 A. I missed that one, but I got the larger one.

Q. All right; you have got the big one out here under No. 53?

A. Yes, and that has zinc in it.

Q. And dips in what direction?

A. It is about vertical.

Q. What is this 53 north; what does that mean?

A. This represents the dip of a slip there; there is a slip there that dips differently from the zinc as I remember.

Q. What kind of slip; is there gouge on it?

A. A little gouge slip, yes.

Q. Well, then, have you got the mineral of a vein there?

A. I have got a broad band down here marked by me "ZN," indicating zinc, and then the cobweb stockwork structure north to the south side line of the Jersey Blue, where there is another quite definite vein or veinlet, which has also quartz and zinc and stands vertical.

Q. You did not take the course of those; you just platted them as they appear in the crosscut?

A. I took the courses and also platted them.

Q. What were the courses?

A. Just about north 50 west for the one marked zinc.

Q. Then you followed on up and then have you the strike of the wall of this vein—there is some more mineralization?

1061 A. Yes.

Q. Any gouge there?

A. A little on the south edge of it.

Q. It is not shown on the map, is it?

A. It is not very much.

Q. It is not shown there at all, is it?

A. Well, I say there is not very much there. That is the position of it.

Q. And what is the course of that gouge?

A. North 40 west.

Q. And how far along that drift is that shown?

A. Going northeasterly.

Q. Then what is there till you get to the vein?

A. The northwesterly structure shown on the map proceeds for about 12 feet, then the structure turns easterly and westerly, being the main body of the vein.

Q. Now, then, from that working until you get through to the 1511 and the stope from it, there are no openings upon the vein?

A. Well, there are openings immediately below this map.

Q. Are you projecting your geology onto this section from or do these represent the geology shown on those sections or planes?

Mr. Dickson: That is a level, not a section.

Q. Well, the horizontal plane. Are you projecting geology onto this level?

A. This is drawn solid because immediately below there is a stope which gives the position of it.

1062 The Court: That does not answer the question. Answer the question first.

A. Yes, the maps represent as precisely as possible the form and position of all the veins upon them.

Q. I will change the question. Where there are workings shown upon the levels represented on these exhibits, have you projected any geology?

A. Oh, there are short projections on this, yes.

Q. Why do you project the geology when you have a working upon the level?

A. We don't project it where we have the working; we project it slightly in some cases where there is a gap between workings.

Q. Now, then, Mr. Finch, going to the 1511 cross cut, is that following in vein material or practically entirely in the vein material as shown upon Exhibit 81?

A. That is in a combination of granite and vein material.

Q. Where is the granite there according to your notes?

A. There is no perfectly unaltered granite in that cross cut.

Q. Well, perfectly unaltered, what do you mean by that?

A. I mean there is no granite in that cross cut that has not been affected by one or the other of the veins and to a certain extent filled with ramifying veinlets mineralized.

1063 Q. You call all that sort of granite vein matter, do you?

A. Well, I don't know; it is largely a matter of judgment as to what you would call it.

Q. What is your judgment?

A. It is my judgment that there are three rather distinct bands of mineral matter, which might be correlated as probably three distinct veins, with granite very highly altered and considerably mineralized in between them.

Q. Now, I want your distinction between the granite which is part of the vein and the granite which is altered and is not a part of the vein?

A. Well, the granite which is no part of the vein—to answer your question as to the distinction—as in 1509 cross cut, where it is perfectly solid fresh granite not affected by the hot solutions that made these ores, that is not regarded as part of any vein naturally. But in other places where the Black Rock-Elm Orlu vein and the Black Rock vein are approaching each other, there is an area as in that part of the cross cut adjoining survey station 47, in which there is a great deal of mineralization, some of it of commercial value, between the main part of the two veins.

Q. The direction or course which you have given to the little red

lines that cross in a northwesterly direction the northern portion of 1511 cross cut is taken in that cross cut, were they?

A. Oh, yes.

1064 Q. And how many observations did you make there in order to get these very numerous red lines or bands of ore striking as you show them there?

A. That, as I have already explained, does not mean numerous little bands of ore, but it is designed to show that the direction of the structure of the ore corresponds precisely with the comparatively solid ore body shown on Plaintiff's Exhibit No. 23, and begins just north of Station 47.

Q. Mr. Finch, where a fault vein such as one of the northwest series, in its course reaches—one of the oldest veins—it may pass through it or be diverted around lenses in it or be diverted by a soft portion of the older vein or pass through the older vein in any circuitous route, may it not?

A. Yes, I think that does happen.

Q. You spoke of the Emily vein as one of the veins which has developed ore bodies at great depth, where they were not near the surface?

A. Yes.

Q. You are quite familiar with that vein?

A. I think so, yes.

Q. You know it here in the Poser, do you not, between—passing northwesterly, the same vein, isn't it?

A. I have seen it only in one stope in the Poser and as I recall it that is in the 500 foot level.

Q. Don't you know that it has been mined right to the surface of the Poser?

A. I don't know that that vein has, no.

1065 Q. The northwest Emily vein?

A. No. If anything has been mined there I think it is more likely of the old series; possibly coincident with it.

Q. You spoke of the Black Rock, so-called Black Rock vein, what we call the Jersey Blue vein, being mineralized with solid zinc ore in the Black Rock tunnel?

A. Yes.

Q. And gave that as one of the reasons why you believed it to be of the same age as the Rainbow, what we termed the Rainbow vein?

A. Yes.

Q. Can you explain to the court why it is that the Rainbow vein has no zinc ore above the 500 foot level and that further up it has been mined as a silver vein, while you find the zinc ore in the Jersey Blue coming down near the surface?

A. I don't think that is the case, as you have stated it in your question. It is true of the Black Rock vein that certain parts of it have been oxidized down to a depth of four or five hundred feet and some of the minerals removed, leaving thereby a concentration of silver which was probably originally associated with the lead in it,

making silver ore by that means. At other points the lead and zinc remain in fissures in points approaching the surface as in the Black Rock tunnel. I think it is also true that there was zinc in the Elm Orlu vein. There are a series of stopes which are unaccessible to me between the 500 foot level and the surface, but I have no doubt that zinc is found in these levels.

1066

Q. You have no knowledge of it?

A. I have no knowledge of it—I think I have found zinc at a number of points not over 100 feet from the surface.

Q. How do you explain the difference in the oxidization of the Rainbow lode and the Jersey Blue?

A. I don't think there is any difference.

Q. You have referred to the fact that for four or five hundred feet the Rainbow lode is oxidized, and silver also, commercial silver also seen in that depth?

A. I was speaking of the Black Rock vein and the Elm Orlu vein both in that statement.

Q. Where in this so-called Jersey Blue vein——

A. Black Rock vein.

Q. Well, I don't care what you call it. Taking it from the point——

Mr. Dickson: Mr. Gray, may I ask you—it escaped my attention—is there any testimony as to that, what was found in the Rainbow lode in the way of zinc down to the 500 level?

Mr. Gray: Certainly. Senator Clark testified that they mined it for the silver ores down to the 300 and Mr. Pyle testified that for seven floors above the 500 they mined it as a silver vein, and when they got down to the 700 it was a zinc vein.

Mr. Dickson: You may be correct about it.

1067

The Witness: I might state what I know on that subject of the Black Rock mine. I have had interest in observing the result of the mining of the ore and the operation of the mill from time to time from the records and I find that even down on the 700 foot level, between the 700 and the 500 foot level of the Black Rock mine, that they are mining the ore for zinc ore; that it carries increasing values in silver as it goes upwards, rapidly increasing values in silver.

Mr. Gray: That is in what portion of the Black Rock mine?

A. The region just east of the Black Rock shaft; between the 700 and the 500.

Q. Let us get over to what we call the Jersey Blue vein and take it from the point west to 1052—or west of 755, within that vein are there any stopes—silver stopes immediately westerly?

A. It has only been opened for less than two years, and nothing but a drift driven upon it. Stoping operations have not started.

Q. You say that the Black Rock tunnel has been opened less than two years?

A. That drift upon it, yes.

Q. It is true, however, that there are no such stopes?

A. No, but it is also true that there could be such stopes.

Q. In addition to the Black Rock tunnel, there were other
1068 tunnels crosscut it years ago, the Dewey tunnel crosscut it, did it?

A. Yes.

Q. Is there any drift on it?

A. There is not.

Q. Was there prior to two years ago?

A. No, I think not.

Q. And any working on it?

A. The Dewey tunnel cuts in where it is particularly good ore.

Q. But it wasn't stoped—zinc ore?

A. Yes, that is the reason why it wasn't stoped.

Q. How far below the surface——

A. Pardon me to make that explanation. Zinc ores were of no commercial value in this district at the time of the old period of silver mining. They now are. And zinc bodies which are now opened up will be mined.

Q. Was that accessible at the Dewey tunnel?

A. Wasn't at that point; was at other points.

Q. Where was it at the Black Rock?

A. Some accessible down to the four hundred level.

Q. Is it the same character of material you found in the Rainbow vein down to the 400 level?

A. I think it is, yes; that same segment of the Rainbow vein, as you term it.

Q. Yes, sir.

A. There is a part of the Rainbow vein lying east of the south-
west corner of the Black Rock claim which is about the same
1069 size and same character and is affected in about the same way by all geological agencies as the Black Rock vein. West of that point in the Elm Orlu where the vein spreads out and becomes better, as it does, east of the Black Rock shaft in the Black Rock vein, the conditions differ also at the area on which the silver ore is formed because of freedom of downward motion of the circulating solutions in those bodies.

Q. And you think the silver ores were not formed in the Jersey Blue for that reason; there was not the freedom for the circulation of the water?

A. There was not the freedom in either place——

Mr. Dickson: I didn't hear the answer.

A. There was not the same freedom of circulation downward in that area near the surface between the west end line of the Black Rock that there was west of that point on the Elm Orlu or east of the junction around the Black Rock shaft.

Q. Any copper ore in the Jersey Blue vein?

A. Nothing to speak of; not of any consequence at all.

Q. You mean by that there is no commercial copper ore?

A. No, there is none.

Q. Well, there is—is there copper ore in that vein, in either the Dewey tunnel or the Black Rock tunnel?

A. There is some copper in the 400 foot crosscut, just about at the point where the Black Rock and the Elm Orlu veins are
1070 united, and that is about the only place that I can recall now.

Q. About where the Dewey tunnel cuts it?

A. I think you will find copper mentioned there, but then all the mineral constituents in the vein there are not conspicuous, and I haven't made any note of it.

Q. I exhibit to you five pieces of rock and ask you if you would call that copper mineralization conspicuous?

A. It is "conspicuous" perhaps; a copper cent would oxidize and produce more.

Q. You have not observed that in the Jersey Blue vein where the Dewey tunnel cuts it?

A. I have observed it in one of these tunnels and I forget which it is. It may be the Dewey, yes; it is either that or the Black Rock crosscut tunnel.

Mr. Gray: I ask that these be marked.

The Witness: Yes, there is such a place in one of these tunnels.

Mr. Gray: These were taken from the Dewey tunnel.

Whereupon the five specimens of ore were marked Plaintiff's Exhibits 95 to 99, inclusive.

The Witness: Yes, on other places in the Jersey Blue-Black Rock vein, as we call it, why, there are some copper minerals as there constituted, down in the deeper level. I remember it as a
1071 fact without being able to locate the stopes, but there is some chalcopyrite occasionally.

Q. You have given the distance from the southwest corner of the Black Rock to the north wall of the vein as it crosses the north wall of the vein. Will you now give it to me to the south wall or the east wall?

A. It is 285 feet to the end of the solid drift of the material.

Q. Just point to that?

A. That is the end of the heavy red line. Then it is about three hundred feet to the extreme limit of rock alteration bordering the vein, with a few little seams in it. To be consistent with the interpretation of a vein at other points I should say that ought to be included and would make the distance about three hundred feet.

Q. What is the character of the next fifteen feet beyond the three hundred?

A. So far as shown in the trench just to the south of the line it is granite.

Q. Unaltered?

A. Unaltered except by surface influences; unaltered by any vein action.

Mr. Gray: That is all.

Redirect examination.

By Mr. Dickson:

Q. I did not fully understand, Mr. Finch, you said near the outset of your cross examination about the vein found in the
1072 Jersey Blue shaft shown upon plaintiff's exhibit 4. Do you think that vein should be correlated or can reasonably be correlated with what we call the Black Rock vein?

A. I haven't thought so, no.

Q. For what reasons?

A. Well, it has a northwest direction, which is a direction not shown in the developments of the Black Rock vein. The Black Rock vein, it appears to me, has been developed in an almost east and west direction at the 400 level of the Black Rock, as shown upon plaintiff's exhibit, and upon defendant's exhibits too, beyond the point where the northwest vein comes down along the hillside, along the Jersey Blue claim.

Q. Where do you have the most westerly determination, by outcrop, of working trenches, of what we have been speaking of here as the Black Rock vein, that courses easterly and westerly, substantially?

A. We find the vein material of the Black Rock vein in the gulch. There is scattered along Deadwood gulch west from the mouth of what has been called the gulch tunnel in the bottom of it, has been at various times a line of mineralization, which, although it can be seen only in spots, nevertheless is I believe the westerly continuation of the Jersey Blue vein—Black Rock vein.

Mr. Gray: Can you point that out on the map?

(Witness indicates.)

1073 Mr. Dickson: That is about the word "tunnel" just southwest of the 620 on exhibit 64?

A. Yes. That is not such a vein as is definitely observable on account of the fact that you can see it only in spots. The vein is definitely shown in the shaft, shown upon the surface map.

Q. What shaft; how is it designated?

A. Well, it is the shaft which connects with the large tunnel.

Q. Is that Deadwood gulch represented on this model?

A. Yes, it is carved out of the surface of the model.

Q. What is the strike on the surface of the Black Rock vein from its extreme westerly representation in red upon exhibit 64 easterly to the section line 25?

A. North eighty-five degrees west. There are more accurate ways of doing that, but I think that would be accurate within a degree or two.

Q. And what is the course from the western termination or representation in red of the Black Rock tunnel on this exhibit 64 to the Jersey Blue shaft?

A. Just an arbitrary direction there or the direction of this vein?

Q. Is there a vein cut in the Jersey Blue shaft?

A. Yes, there is a vein just around the surface, collar.

Q. What would be the direction of the vein shown in the Jersey Blue shaft from thence to the most westerly representation
1074 on this exhibit of the Black Rock vein, colored red?

A. About north fifty-five degrees west.

Q. And what was the condition of the surface of the country between that Jersey Blue shaft and this western representation of the Black Rock vein; could you observe it; is it obscured in any way, and if so, how, and by what?

A. That is buried by wash from the Jersey Blue shaft to the gulch.

Q. How deep is the wash, very deep or shallow?

A. Yes, it is very deep, fifteen or twenty feet along the gulch.

Q. Give us the thickness and a brief general description of the vein shown upon defendant's exhibit 65 as crossing the Clark tunnel marked on this exhibit "Deadwood vein"?

A. I should say there was at least five feet of definite material—definite vein material shown in the Clark tunnel at the south of the drift running northwesterly. The drift does not disclose the entire vein; runs along the side of it, and then there is an additional width of considerably altered country with seams in it.

Q. What minerals are there in that vein visible?

A. Well, there are quartz and manganese.

Q. In answer to a question on cross-examination with reference to stopes in the Jersey Blue vein at or westerly of where it is cut
1075 by that tunnel, you said that there were no stopes, but it is also true that there could be stopes. What did you mean by that?

A. I meant there was ore in the tunnel.

Q. Merchantable ore?

A. Yes.

Q. To what extent have you projected your geology on, we will say, the 1400 foot level or the one you were asked about on cross examination about such projections, and from what levels do you show these projections.

A. The 1400 Elm Orlu.

Q. The 1400 Elm Orlu—I think that was the level. Do you remember, Mr. Gray?

Mr. Gray: What is that?

Mr. Dickson: You were asking him some questions about the projections of geology.

Mr. Gray: I was asking him generally.

Mr. Dickson: To what extent have you projected any geology upon this exhibit 81, and from what data observable above or below the level or in workings on the level?

A. There is very little projection except at certain points where it is stated. For instance, in the region east of the Bruce raise there is a projection downward and it is brought upon the map, shown in section 23, and that means that there are developments within a short distance of that plane.

Q. How far?

A. These are projected on strike between the Bruce raise
1076 and close to 1511. The extreme projection is 100 feet.

Q. In the Black Rock vein shown upon this exhibit 81, between the continuation of the long crosscut running out from the Elm Orlu shaft northeasterly and that crossing the vein and the stoping shown upon that vein for some distance, maybe fifty or sixty feet west from the 1511 crosscut there are no workings shown. From what data have you represented the geology on this exhibit between the westerly end of that stoping and the place where the crosscut practically on the western end line of the Black Rock cuts the vein?

A. A point is shown as indicated upon the skeleton model of the plaintiff which gradually dips down lower and lower as you go west. So for about half the distance between the end of the stopes and crosscut 1501 there are stopes within 20 to 25 feet.

Q. Immediately below?

A. Yes. And to the extreme west at crosscut 1501 the developments are at forty feet—no, less than forty feet, thirty-five feet.

Q. You spoke of there being in certain places less freedom of circulation of surface waters downward. Whereabouts is that; what section is it?

A. In an area between two northwest planes, roughly from the east end line of the Black Rock to the Deadwood vein.

Q. As shown upon that exhibit?

1077 A. Exhibit 65.

Q. Well, now, would there be less opportunity for downward circulation of the surface water—what effect would that have upon the process of leaching out any of the metals as they were originally deposited?

A. There would be less leaching out because it requires freedom of downward circulation of surface waters to carry the oxygen of the atmosphere, which does the first steps in the process of the transforming of the sulphide minerals to other minerals that can be carried away in solution.

Q. And carried to deeper levels as these leach out?

A. Yes.

Q. I will ask you whether or not you find—you found in the stopes ore in which there was silver ore where litigation development was first started in the Black Rock vein, in the Black Rock tunnel. Refer to your notes please.

A. The question concerning silver ores is more difficult to answer. Silver requires an assay; it is not always visible to the eye. The best that I can say as to that is that it looks like good ore in the Black Rock tunnel where the development started.

Q. Whether it carried silver values you could not determine from an ocular inspection?

A. No.

Q. Would you give the same answer as to whether or not silver ores are found in the Dewey tunnel?

A. My testimony was intended to be directed to the zin

1078 ore particularly; and I do know that as you approach the surface the zinc ores contain more and more silver.

Q. In the line of works in the Black Rock tunnel—Black Rock vein, rather, between the Black Rock and Dewey tunnels, have you had assays made to ascertain that?

A. Assays have been made, yes, but I didn't make them myself.

Q. Did you observe any copper ore at any place in any of the workings of what we call the Elm Orlu-Black Rock vein, apart from where it is intersected by the copper vein at the western end?

A. Yes, at one or two points.

Q. Of what levels?

A. One thing I have particularly in mind is a definite little band of copper in one of the crosscuts on the Elm Orlu lower levels in the region 200 feet or thereabouts west of the Black Rock west end line, and I have forgotten just which one it is.

Recross-examination.

By Mr. Gray:

Q. It is down near the copper vein, Mr. Finch?

A. No, the instance I have in mind is not.

Q. Well, let's find the place then?

A. I have a note on that somewhere, but I can't find it just now.

Mr. Dickson: You can look it up this evening.

1079 Mr. Gray: Yes.

Q. I inquired of you this morning as to the points along this so-called apex as you have depicted it of what you call the Black Rock vein, where it was discovered upon the surface, and you said that you had made one observation here in the gulch, where you were able to see it. Now, depicted upon your solid model you have called the attention of the court to the fact that it is shown extending up that gulch. Is that correct?

A. That was my observation, yes.

Q. How many places did you see it extending up that gulch?

A. I did not say that it extends up the gulch.

Q. You have got it marked on your model so, haven't you?

A. I stated that in that part of the gulch in which the vein is represented I found a considerable mineralization as nearly as I could observe it, running in the direction shown.

Q. At what point; can you definitely fix the points and the number of feet from this tunnel and the direction?

A. At points within intervals between the mouth of the tunnel and the end of the representation in red.

Q. Have you any notes on that?

A. I haven't any notes of it here, no.

Q. Isn't it a fact that that vein shows on the north side of the gulch?

1080 A. I think another vein shows on the north side of the gulch.

Q. Isn't it the same vein across the gulch there at the tunnel?
A. I don't think so.
Q. Did you take the course of that?
A. I didn't take the course of it because it is impossible to take the course of any of those things at that point. The position of the Black Rock vein is indicated upon the model to the best of my ability from scattered disclosures of vein matter in the bottom of the gulch at a certain time.
By the Court: What gulch do you refer to?
A. It is part of Deadwood gulch, near the upper tunnel, and lying between sections 16 and 18.

Mr. Dickson: I suggest, Mr. Finch, that the words, "Deadwood Gulch" be written on the model at that point indicated.
Mr. Finch: Yes, sir, I will have that done.

(Witness excused.)

Vol. II

TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1916.

No. 466.

BUTTE & SUPERIOR COPPER COMPANY, LIMITED, APPELLANT,

vs.

CLARK-MONTANA REALTY COMPANY AND ELM ORLU MINING COMPANY.

APPEAL FROM THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE NINTH CIRCUIT.

FILED AUGUST 5, 1916.

(22,624)

INDEX TO VOLUME II.

	Original.	Print
Testimony of R. C. Davis	1080	539
William L. Creden	1093	545
William H. Emmons	1097	547
Rollin D. Salisbury	1213	604
Albert Burch	1294	642
Walter H. Wiley	1420	703
Albert Burch (recalled)	1535	757
John W. Finch (recalled)	1540	759
John D. Irving (recalled)	1557	768
Walter H. Wiley (recalled)	1560	769
Henry D. Morse	1561	770
Defendant's Exhibit 120—Agreement between Clark-Montana Realty Co. and Peake, October 29, 1906	1574	776
Defendant's Exhibit 121—Letter, Bruce to Mangam, June 14, 1915	1577	778
Testimony of George M. Bennett	1580	780
Testimony of A. B. Clark (recalled)	1589	785
Defendant rests	1595	788
Testimony of Walter M. Bickford	1596	788
John D. Irving (recalled)	1600	790
Fred Searls, Jr. (recalled)	1640	809
Fred T. Greene (recalled)	1700	839
Walter Harvey Weed (recalled)	1735	856
Frank A. Lindforth	1736	857
Horace V. Winchell (recalled)	1739	859
Walter Harvey Weed (recalled)	1757	868
Plaintiff rests	1759	869
Testimony of Albert Burch (recalled)	1760	869
John W. Finch (recalled)	1771	875
Walter H. Wiley (recalled)	1789	883
Henry P. Morse (recalled)	1794	886
Testimony closed	1798	888
Colloquy between court and counsel	1799	888
Stipulation as to exhibits, &c	1801	889
Judge's certificate to statement of evidence	1802	890
Clerk's certificate	1804	890
Order that portion of opinion of Bourquin, J., be printed as a part of record on appeal	1806	891
Stipulation that portion of opinion of Bourquin, J., be printed as a part of record on appeal	1807	892
Portion of opinion, Bourquin, J	1808	892
Service of transcript of record	1818½	897
Order of submission	1820	898

	Original.	Print
Order filing opinion and recording decree	1821	899
Opinion, Gilbert, J.	1822	899
Decree	1839	908
Petition for rehearing	1840	908
Order denying petition for rehearing	1860	917
Orders staying mandate	1861	918
Petition for appeal	1865	921
Assignment of errors	1867	922
Order allowing appeal	1880	930
Bond on appeal	1881	931
Citation and service (copy)	1883	932
Stipulation as to record	1884	933
Præcipe for record	1885	934
Clerk's certificate	1887	935
Citation and service	1888	936

Testimony of R. C. Davis for Defendant.

R. C. DAVIS, called as a witness on behalf of defendant, being first duly sworn, testified as follows:

Direct examination.

By Mr. Kremer:

I will state to the court that Mr. Davis is not called as an expert, but as a witness to a certain series of facts which might properly be shown at this time.

1081 Q. What is your name?
A. Robert Davis.
Q. What is your business, profession, or occupation?
A. Mining engineer.
Q. How long have you been a mining engineer?
A. 14 years.
Q. How continuously have you been engaged in mining?
A. All that time.
Q. In what capacity, Mr. Davis?
A. As mining engineer and superintendent.
Q. Of what properties have you been superintendent?
A. The Butte-Superior, the Iron Mountain Tunnel Company, the Blue Bird mine, that is all.
Q. When were you superintendent of the Butte & Superior Copper Company?
A. From 1906 until 1909.
Q. Do you remember approximately the time in 1906 when you first were engaged as superintendent of the Butte & Superior properties?
A. It was in the fall as I recall it, October or November.
Q. Do you recall, Mr. Davis, the physical condition of that property with reference to working at that time?
A. I do.
Q. State what the physical condition was?
1082 A. Well, there were the old silver workings, as we called them, that had been worked out, and the shaft was down to the 500, two compartments, and had just been retimbered. The old workings were partially open, but mostly caved and filled and inaccessible.
Q. What do you mean by the old workings?
A. What had been known as the old Black Rock silver mine.
Q. In what portion of the property were they?
A. Above the 500; the surface workings and the 250 and the 350 and the 450.

Q Do you recall what the first work was that you directed when you took charge of the property; of course I mean after putting the property in shape to work?

A. The first work done was necessarily done on the upper levels while the shaft was being sunk, and that was on the 400 and the 500.

Q. What was the character of that work?

A. On the 400 I cleaned out a drift in the old workings to a point about 300 feet west from the shaft, and from there I went on a course about parallel or practically so with the side line toward the Jersey Blue, looking to prospect the Jersey Blue vein, and then working east on the 500 about 350 feet east of the shaft, a little advance in the drift, and a raise started on silver ore, but running into high grade zinc.

Q. Where was that?

A. On the 500 about 350 feet east of the shaft.

1083 Q. How did that compare with the drift that you drove on the 300 to the west?

A. I didn't drive anything on the 300 to the west; it was the 400 to the west.

Q. Well, the 400 west, how did it compare in direction with that drift?

A. Well, as I remember, the one to the east slightly north of east, and the one to the west was south of west for a while, and then it turned to the northwest.

Q. After the drift on the west on the 400—what was that known as, what drift; did you give it a name or a number?

A. A number I think; I have it in my notes; I can look up the number.

Q. Refer to your notes and give us the number of that drift.

A. It was 403 drift.

Q. Now, Mr. Davis, before taking up the 403 drift, which I will do a little later, I will ask you whether or not from your notes or your recollection you can state the progress of the development of the Black Rock mine from the time that you took charge or at least from the time that you did the work upon the 500 up to the time when you severed you- connection with the Butte & Superior Company, giving as near as you can the year in which the work was done?

A. Yes.

Q. Proceed. So that you will understand me more fully, proceeding into the deeper levels, of course, extending downward,

1084 explaining what you did on each level as you descend into the mine?

A. In the last part of 1906 and practically all of the year 1907 we were of course engaged in sinking. In 1908, when the development started on the 1000, there was practically no development work in the lower levels before 1908.

Q. Where did you start to sink the shaft, on the 500?

A. The 500. First we raised one compartment from the five to the surface, it being only a two compartment shaft at that time, and then we sunk the whole shaft down.

Q. To what depth?

A. To the 1600.

Q. Did you have any lateral workings between the levels, between the 500 and the 1600 aside from the stations?

A. All the way down.

Q. Well, just as you proceeded into the deep, can you state at each level to which you sunk the shaft from the 500 what, if any, lateral work you did?

A. First from the 500 to the 700.

Q What did you do upon the 700?

A. Cut a station and a short drift and made a pump tank.

Q. In which direction did you drift?

The Court: Is this material?

Mr. Kremer: I think it is, your honor.

1085 The Court: The order in which this work was done?

Mr. Kremer: The order would not be so material, except that we want to carry this work down, in the order, as has been disclosed by the evidence, the complainants in this case have had access to these workings. I don't think it will take very long.

The Court: Yes, but what is important is what is there; what difference does it make as to the order in which the work was done?

Mr. Kremer: The order of the work is not so material, but the time when certain ore bodies were reached and so on will involve a question that will be argued to your honor later.

Q. Proceed briefly.

A. On the 1000 we drove the main cross cut 135 feet, finishing in October, 1908, cutting about 40 feet of vein. On the 1200 main cross cut we drove about 200 feet, finishing in December, 1908, cutting the Black Rock vein.

Q. Was that to the west?

A. To the south; the main cross cut south from the shaft.

Q. Was that west of the shaft in direction or was it straight back?

A. Well, practically, south from the shaft, at an angle. On the 1200 I drove a drift east on the vein 300 feet, cross cut the vein north, cross cut 235 feet; vein matter for the greater part of 1086 that distance; cut through the vein and into the solid granite with the end of the cross cut. On the west 1200 we drifted about 720 feet. At a distance of 385 feet that cross cut through the vein; the vein width at that place of about 35 feet of high grade ore, and the whole vein width of perhaps 100 feet or more. At the end of the 720 foot drift another cross cut north which is on the end of the Black Rock claim. Then down to the 1400; the main cross cut south from the shaft, going through the Black Rock vein, the cross cut going into granite on the other side. The entire length of the cross cut is 230 feet. This was finished in March, 1909. Drifting east from this cross cut on the vein 75 feet. Cross cut north through the vein for a distance of 105 feet. Drifted west from the vein 1400 cross cut for a distance of 280 feet. At about 175 feet out, cross cut north through the vein; 100 feet perhaps of vein matter. Finished in September, 1909.

Q. How far west of the shaft did these workings carry you that you have described?

A. The most distant point is about 720 feet of workings, but it lines right up with the west end line of the Black Rock claim.

Q. That is the working that you referred to——

A. That is drift 1204.

Q. That is the working on the 1200 that you mean?

A. Yes.

Q. Now, does that comprise all of the workings?

1087 A. Well, all of the lower workings. There was more westerly working on the 400.

Q. I will refer to that in a minute. At what time did you say that you severed your connection with the company?

A. 1909.

Q. Mr. Davis, referring now particularly to the working upon the 400 of the Black Rock, tell the court just how you proceeded with the work toward the west and state when you first encountered or entered the Jersey Blue claim in that working?

Mr. Gray: As to all these dates, what have they to do with this matter; I presume there is nothing occult about them.

Mr. Kremer: It is in connection with the transfer, following up to the time of the transfer, and the designation of the ore bodies. That will involve the matter of the transfers and the knowledge of the development of certain ore bodies, when made and the continuation thereof, particularly identifying it at the time of the execution of your deed.

Mr. Folsom: This occurred some years after the deed, didn't it?

Mr. Kremer: I know, but you will remember that there was a connection with the 500 at the time of the execution of the deed. These ore bodes were connected up at the time of the execution of that deed.

A. We drove through and cleaned out the old workings,
1088 numbered on Exhibit 67 as 402, to about this point, which is 80 feet from the end line of the Jersey Blue. Leaving the old workings at that point, and starting off with new work in a northwesterly direction, the drift crosses the south side line of the Jersey Blue at a point about 150 feet from the southeast corner of the Jersey Blue claim. Driving in this direction until a distance of about 1000 feet west of the Black Rock shaft is reached, where the drift cuts about 30 feet of zinc ore, averaging about 15 per cent zinc.

Q. At what time was that work done?

A. That vein was cut in September, 1908.

Q. How far west of the east end line of the Jersey Blue was that vein cut by the workings that you have described?

A. Approximately 350 feet due west from the end line, on a line drawn east and west, not on the strike of the vein.

Q. How far did you proceed along that vein or how far was that vein developed after striking it?

A. I only developed it as much as I could by a cross cut and a drift

running through it diagonally, the drift being in the vein for a distance of 120 feet.

Q. How far would you say the most westerly development along that vein would be from the east end line of the Jersey Blue?

A. 475 feet.

Q. What is the strike of that vein at that point?

A. South 80 degrees east.

1089 Q. And did you ascertain its dip?

A. No, I didn't; it looked, as I remember, vertical. I could not tell much dip from the observation, the chance I had in there; I could not tell the dip.

Q. State whether or not you found manganese in that vein?

A. Yes.

Q. To what extent?

A. Well, it was quite prominent.

Q. Mr. Davis, what did you do at the end of the working when you left the vein; in what direction did you go?

A. I crosscut about 50 feet north into the granite.

Q. Did you encounter a vein there?

A. No. The work stopped at about 50 feet north.

Q. Is this map that you have referred to a map that was in your possession at that time?

A. It is.

Q. Do you identify this as the map upon which you made your notations at that time?

A. Yes.

Q. Of what was disclosed?

A. Yes.

Q. And is that map in the condition now, substantially, as it was then—I mean, making allowance for its physical appearance by reason of age and so on?

A. Yes, sir.

Mr. Kremer: We offer the map in evidence.

1090 (Map admitted in evidence without objection marked Defendant's Exhibit No. 100.)

Q. Referring to Defendant's Exhibit 100, I will ask you, Mr. Davis, to state how far from the south side line of the Jersey Blue claim the vein which you cut in the Jersey Blue is located, the south wall of that vein?

A. 60 feet.

Q. Mr. Davis, while you have your scale in your hand, kindly measure upon Defendant's Exhibit 67 to the vein disclosed thereon and mark the Black Rock vein at a point from the south side line of the Black Rock claim to the south wall of the vein as shown upon Defendant's Exhibit 67?

A. 110 feet.

Q. Please state what the distance is from the point where the working you have described crosses the south side line of the Jersey

Blue through the Black Rock vein as projected upon Defendant's Exhibit 67?

A. 100 feet.

Q. And finally I will ask you to scale from the south side line of the Jersey Blue to the point where the projected workings upon this Exhibit 67 encountered the south wall of the vein?

A. That is not a projected working.

Q. Well, where the working encountered the vein?

A. Where the working strikes the vein, the south wall of
1091 the vein at that point is about 60 feet north of the side line.

Cross-examination.

By Mr. Gray:

Q. This looks like a Brunton survey.

A. It is.

Q. It is not a transit survey?

A. No.

Q. Did you find out before you left that there were some inaccuracies in the survey?

A. Nothing that I found out, no.

Q. Well, how far back did this Brunton survey extend? Clear back to the shaft?

A. No, sir; I had Mr. Clark's old mine surveys of that old work.

Q. What old work?

A. Up to the point where I started off with the new work.

Q. Well, your work was a Brunton compass survey?

A. At that time, yes, sir.

Q. And all this work on the 403, that was Brunton work?

A. Yes.

Q. That extended clear back to the square raise, the connection there?

A. Well, I will explain that, I think. This old working was No.
402 to this point, and from that point on it was taken as 403,
1092 as you see it on this old map. I notice on this exhibit the entire drift is numbered 402.

Q. When was this geology put on this map?

A. Well, according to those dates, in 1908 and 1909.

Q. These red lines here you put on at that time?

A. Yes.

Q. Did you get the dip of that vein?

A. I did not.

Q. How did you happen to cross cut north there after cutting a large vein of this kind?

A. I was going to cross cut still further north, but at that time there was other work came up and interfered.

Q. What was the character of the south wall?

A. Granite.

Q. Any gouge on it?

A. Yes.

Q. On the north wall some gouge too?

A. A little gouge on both walls.
Q. Now, this 403, had it been crosscutting the country or following a vein?
A. It was crosscutting.

Redirect examination.

By Mr. Kremer:

Q. Mr. Davis, I will ask you to step to Plaintiff's Exhibit 4. I wish you would scale the distance from the east end line of
1093 the Jersey Blue to the point indicated as showing an elevation 6040 feet, and state how far that is from the east end line of the Jersey Blue?
A. About 218 feet.
Q. How far did you say your westerly development upon the vein cut in that working was, the westerly exposure of it?
A. The furthest west?
Q. Yes, in a straight line.
A. About 475 feet.

(Witness excused.)

Testimony of William L. Creden for Defendant.

WILLIAM L. CREDEN, called as a witness in behalf of defendant, being first duly sworn, testified as follows:

Direct examination.

By Mr. Dickson:

Mr. Creden is not called as an expert, your honor, but to testify as to some facts.

Q. State your name and residence?
A. William L. Creden, Butte, Montana.
Q. What is your business?
A. Engineer and mine operator.
Q. Are you connected with the Butte & Superior in any way?
A. I am.
1094 Q. In what capacity?
A. Consulting mining engineer.
Q. I call your attention, Mr. Creden, to the long cross cut spoken of by some of the witnesses, I believe, as the Clark cross cut, which I indicate on Plaintiff's model Exhibit 46—I mean a raise. Was any portion of that raise driven by the plaintiffs, the Elm Orlu Mining Company, or the Clark-Montana Company?
A. I don't know just exactly to what you refer.
Q. This long raise?
A. The Elm Orlu Mining Company ran it from the 1200 Elm Orlu up to the 800 Elm Orlu.

Q. Will you point that out on this model, please?
A. From the point here on the 1200 of the Elm Orlu to that point there on the 800 Elm Orlu.
Q. Does that follow a vein all the way up where it goes upward, or did it rise upward from the vein anywhere?

Mr. Gray: We are not making any question that that vein is continuous between those points, although the working is not all in it.
Mr. Dickson: I was trying to find the reason why the Elm Orlu people stopped it where they did.

Q. The upper part of that raise, driven by the Elm Orlu Company, say 40 or 50 feet below the 800, was that driven in the vein or outside of the vein?
A. It was not driven in a big vein; it was driven in a small stringer about eight or ten inches thick.
1095 Q. Up to that point what had been the downward course or dip of the vein as disclosed in that vein?
A. Very nearly vertical.
Q. And on the 800 foot level what was its dip?
A. From the 800 upward it dipped to the south.
Q. Rising to the north?
A. Rising to the north.
Q. Do you know of any copper ore having been mined out of what is called the Rainbow lode apart from where the copper vein intersects it?
A. I think I have such a place in mind.
Q. On what level or levels?
A. On the 1100 foot level of the Elm Orlu on the hanging wall of the vein.
Q. Can you point to about where on the 1-00 Elm Orlu?
A. Yes, I can point that out; stope 1106 on Defendant's Exhibit 73 was a copper stope.
Q. Was that connected with the copper vein?
A. In no way that I know of.
Q. Are there any other places?
A. The stope immediately below drift 1110 was a copper stope, and ran along the hanging wall of that vein.
Q. Any other places in the Rainbow or Elm Orlu-Black Rock vein where copper ore, to your knowledge was mined or encountered, apart from where the copper vein intersects that Rainbow?
1096 A. I think those are the only two places I can recall.

Mr. Dickson: That is all.

Cross-examination.

By Mr. Gray:

Q. Are there any northwest fissures at these places where you say there was copper ore taken out?
A. None that I recognize as northwest fissures.
Q. Do you find any fault fissures there?

A. No; straight east and west fissures.
Q. Easterly.
A. Yes.
Q. You were through this raise called the wet raise, sometimes called the Clark raise, from the 1304 up to 1012, during the time it was being driven?
A. Yes, sir.
Q. Very wet, wasn't it?
A. Yes, sir.
Q. That is where it got its name, "wet raise"?
A. Yes.
Q. And you think it followed up a slip part way here above the 1200 and then from there went up in granite, is that the idea, or did it continue on a slip up to the 800?
A. Above the 1000 level of the Elm Orlu to within a distance of about fifty feet below the 800 level it continues on a strong vein.
1097 From a point fifty feet above the 800 level—from a point fifty feet below the 800 level of the Elm Orlu the raise continues in a stringer of quartz from eight to ten inches thick.
Q. So that really should be all painted to represent vein, in your judgment, between the ten and eight?
A. Yes, and representing the forking of the Black Rock-Jersey Blue vein in its upward course, and the small stringer going upward. That is where this drift was later driven.
Q. What drift is that?
A. It is not noted here.
Q. What drift is that?
A. That ought to show it. From 83 to 87 survey points. Exhibit 13, not described on the map, except it can be described as holding survey point- 84 to 87.

(Witness excused.)

Testimony of William H. Emmons for Defendant.

WILLIAM H. EMMONS, called as a witness on behalf of the defendant, being first duly sworn, testified as follows:

Direct examination.

*M*y Mr. Ellis:

Q. You may state your name.
A. William H. Emmons.
Q. Where do you reside?
A. Minneapolis, Minnesota.
1098 Q. What is your business or profession?
A. I am a geologist, mining geologist.
Q. Did you study your profession at any institution of learning?
A. I graduated from Central College, Fayette, Missouri, in '97.
Q. After graduation, did you pursue your studies at any other institution?

A. I went to the University of Chicago in 1901 as a graduate student. The following year I continued my studies as a fellow in the institution and three years as a research assistant in connection with work done for the Carnegie Institute at Washington.

Q. During the time that you were in the University of Chicago, were you pursuing your studies along the line of enabling yourself to become a geologist?

A. I was.

Q. After leaving the University of Chicago and doing the research for the Carnegie Institute at Washington, which you have mentioned, did you hold any position under the United States Government for a time as a geologist?

A. After 1904 I took the civil service examination and joined the United States Government Survey and was a member constantly employed until 1908.

Q. During the time that you were in the employ of the United States Government did you have occasion to examine mining districts throughout the United States?

1099 A. Yes. I was, as I said, constantly employed for about four years and after that period I gave half of my time to the United States Geological Survey and spent the other half at the University of Chicago where I was in charge of the work in economic geology. During my experience with the United States Geological Survey I studied the geology and mapped the ore deposits in Colorado, principally in the San Juan, including the region around Ouray, Durango, Clark City, Rico and Creede. I studied certain deposits in Utah and deposits at Goldfield, Nevada, Bull Frog, Nevada, Manhattan, Nevada, and the following year at Philipsburg, Montana, in the Little Rocky Mountains, at Cable, Montana, and several other minor, less important deposits.

Q. Are you at the present time connected with any institution of learning, doctor?

A. I am professor of geology at the University of Minnesota, and director of the Minnesota Geological Survey.

Q. State geologist of the state of Minnesota; is that what you mean?

A. Yes.

Q. How long have you been professor of geology in the University of Minnesota?

A. Four years.

Q. And have you been during that same period state geologist of the state of Minnesota?

A. Yes.

1100 Q. Now, as state geologist of Minnesota, what have been your duties with respect to examining ore deposits and the appearance of ores?

A. In connection with my work there I have examined deposits in the great iron region around Mesaba, Vermillion, Cananena, and directed workings on the Cananena, and the extension of the Vermillion region. I have also directed work of various character pertaining to the non-metallics,—not so directly connected with it.

Q. Since you left the geological survey and aside from your con-

nection with the geological department of the state of Minnesota and the University of Minnesota, have you conducted examinations of mining properties?

A. I spent three months in 1907 in the employ of the Cananena Copper Company, making a geological map of the region around Cananena.

Q. Is that what is known as the "Phelps-Dodge" properties in Old Mexico?

A. One of the Phelps-Dodge properties, but the larger property, the one in which I was employed is known as the Coreyan. I believe the Phelps-Dodge are interested in it now. They were not then.

Q. Is that located in Old Mexico?

A. Yes, Cananena, Sonora, Mexico.

Q. Any other examinations of mining properties that you have made?

A. I merely named those districts in connection with my
1101 work on the survey on which I have published reports, professional papers or bulletins. Naturally I visited a large number of districts, Wahoe, Bingham, without making any careful study or going into the details of the ore structure or lode formation.

Q. As to these several districts you have mentioned, you have contributed to the literature of the government only?

A. Yes, sir.

Q. Doctor, have you made an examination of the portion of the Butte district involving the properties in controversy in this action?

A. Yes, sir.

Q. When did you first come to Butte?

A. April 1st, 1915, and spent a week making an examination, a rather hasty one, giving attention particularly to the metallurgical character of the lode. I came back the first of July and spent about eight weeks, most of the time under ground in the study of the lode formation.

Q. And that eight weeks was practically the eight weeks preceding the commencement of the trial of this action?

A. No. It was in July and August. I left about the first of September and got back only a few days before the beginning of the trial. Indeed I did not get into all of the workings that have been made since my previous visit, although I did go into all I had time for.

1102 Q. Since the commencement of the trial of this case have you visited the property to make such further examination as you can?

A. Yes. I have been over a considerable part of the mine verifying my observations.

Q. Doctor, have you ever appeared in court as a witness in any case before?

A. No, sir; I have not.

Q. This is your first appearance in court as a witness?

A. Yes, sir, it is.

Wednesday, October 27th, 1915—10:00 o'clock a. m.

Trial resumed pursuant to adjournment.

Mr. Kremer: We desire to introduce in evidence and ask to be marked as an exhibit in the case a model similar in type to that of the plaintiff, but differing in geology.

The Court: The only difference is the difference in color?

Mr. Kremer: Any other difference is exceedingly immaterial. I wouldn't say that there was no other difference, but I do not know as to that.

The Court: Better label it so we will know one from the other.

Model admitted in evidence and marked Defendant's Exhibit 101.

1103 Mr. EMMONS resumed the stand for further

Direct examination (resumed).

By Mr. Ellis:

Q. Doctor, I wish you would state the geology of the mines in question, concerning the genesis of the ore and the formation of the ore bodies and the fracturing and fissuring connected therewith, to such an extent as you may deem desirable for the enlightenment of the court and counsel?

A. If I may, I should like to preface my remarks by outlining briefly the principal events in the ground which I have examined. First there is granite in this region. It is the oldest rock which I have seen and therefore it represents the oldest event which is recorded in this area under discussion. First, then is the intrusion of granite. This granite is a comparatively uniform rock. This represents it in the unaltered state, or practically unaltered state. It is made up of quartz and felspar, the light minerals, with several dark minerals, horn-blende and pyroxene and magnetite or iron oxide. This granite is intruded here and there by small veins or dykes of aplite, so we can mark the second event the intrusion of aplite. The aplite is a light colored rock. This particular specimen which I took from the 1600 I believe is a comparatively unaltered rock crossed by little quartz veins. That is the matter that intrudes the granite. These intrusions are so very irregular that we cannot correlate them from one place to the other through the mine. They
1104 are extremely irregular and represent something of a magnetic nature and in no sense fissure veins such as have been described. The third event——

Q. Doctor, if you will permit an intrusion, are the samples of granite and aplite marked in any way so that we can identify them?

A. I have the labels on them and they have been marked.

Q. The unaltered granite what label have you for that?

A. It is from the 1200 Black Rock.

Q. And on the paper on which I place the unaltered granite you have the number 150. How is the aplite designated?

A. Black Rock 1600 between sections 27 and 28, 150 feet south of the shaft.

Q. And on the specimen itself, as well as on the paper, I find a number 132.

A. The third event is a fracturing in a general east-west direction of the granite which is mentioned and of aplite. This event is a very important one for this district since it preceded the formation of these great deposits. We do not believe that much faulting took place during this period. It is a difficult matter to tell positively because as I said these aplite dykes are very irregular; we cannot correlate one with the other in different sections of these ore bodies, or the fractures in which the ore is formed. I don't believe that fractures as a rule are formed without some little displace-
1105 ment—that is a straight opening along at right angles to the plane of the fracture is probably a very unusual thing, but there is certainly no recognizable faulting in the fractures which were formed by this third event.

The fourth event is the formation of veins, the Black Rock, and in order that there may be no confusion, I will put Rainbow lode; it is called both; the veins of the Black Rock or Rainbow were formed at this time. Attending that mineralization there was alteration of the granite, and a slight, very slight alteration of the aplite. It did not seem to have a composition that was so easily altered. Here is a specimen of the granite altered by the vein forming processes, with a small veinlet going through it. These minerals have been altered.

(Specimen of granite marked No. 28.)

The Witness: This granite has been altered. These felspars which were hard have been softened and made over, we will say. The material which is there now, instead of this hard and gritty material, there is white mica or cericite, mica crystals of microscopic size, making up those little veins which are nearly the same as this—making up these small crystals of mica, replacing the felspars, the dark minerals, which have changed also to the sulphides which are disseminated through this. We have another specimen marked No. 137, from the Elm Orlu 1600, near one of the
1106 great ore bodies, which shows the same thing, only it is a little more thoroughly altered.

The next event which we have represented here as the Rainbow lode or Black Rock is faulted by a northwest system fissure, which is represented by the Deadwood fracture.

The sixth event, the Deadwood or Northwest fracture, is mineralized, filled in places with vein matter, and in places it is not mineralized. It is not so uniformly mineralized as the fractures of this previous age.

Seventh, the third period of fissuring, accompanied by faulting; that is known as the Black Rock—these fissures that were formed

in this third period of fissuring are known as the Black Rock and associated faults. They have in general an east-west strike; there are many subordinate faults that make out from the main one which is represented on that diagram. During this period the ore was broken up, and in this region it is almost never that we find these faults where they do not carry fragments of these older veins which they have crossed. They are, however, not mineralized themselves.

The eighth event is the oxidation of the rocks and ores. This oxidation is somewhat erratic; it does not extend equal depths at all places. It works changes, and causes changes in the ores; the sulphides are converted into oxides, and to some extent secondary minerals, or minerals later than the original vein formation are
1107 formed. These processes of oxidation at some places occur at considerable depth. Thus on the lowest level of the Elm Orlu, the 1700 level, I find little nests of wortzite supposed, and very properly so I believe, to be secondary—little nests of wortzite in the ore, showing that these processes of alteration have extended to considerable depths, although they have not been important to that depth; they are comparatively trivial things in the lower part of the vein, but nearer the surface they are more important.

Of the fractures which are formed in the preparation of the rock for the reception of ores, the individual fractures have already been discussed and I will merely mention the grouping of the fractures. The common type of fracture like that, a group of fractures, closely spaced, which we call sheeted zones.

Hence and because of the mineralization in the rock a lode of considerable size may be developed in that sheeted zone. Again, there are fractures formed like this, formed at the same time—no two parts necessarily formed at the same time—but in different directions, and we call them conjugated fractures, indicating contemporaneous age. And then there is a third structure which has been described by Mr. Weed and Mr. Sales in connection with the Butte deposits, in their publications; subordinate fractures make off, a very regular fracturing, yet distinctly parallel, in this direction; that has been called
the horsetail group of fractures, indicating a sort of spraying
1108 out from the main limiting fractures, and then there is a sort of spreading out from these fractures. These fractures may be illustrated by physical experiment. The common experiment for testing blocks of wood or stone is to put them in a testing machine to compress them with a known force, and it is found that they break in certain ways. A simple breaking is shown on this first block of wood, where there has been pressure applied and it has broken along lines.

Q. Marked "E"?

A. Yes.

Q. Just explain a little more fully the fracturing shown upon that exhibit?

A. This represents movement along a single plane, a simple type of movement, which is obtained in the crushing of the block which was used to test the strength of a piece of wood. Not always, how-

ever, are fractures so simple as this one which was simply used to test a piece of wood.

Q. You are now referring to exhibit 2?

A. Yes. There are two fractures, the beginning of which might be termed the beginning of the sheeted zone, two parallel fractures. In the third the fracturing has been of somewhat different character and illustrates fairly well what may be called this horsetail structure, two planes here of movement, connected by means of transverse fractures. A section cut across there would represent just about the same thing as we have here, and it would also represent in
1109 miniature the ore bodies, some of the important ore bodies in the mines under consideration.

Q. With reference to what particular section of ore body would that be illustrative?

A. This is shown on this map, it is shown on this map, and there are so many——

Q. When you say "this map" you are referring to defendant's exhibits 77 and 78?

A. Yes. In referring to these deposits in particular there is a great vein coursing nearly east and west which is called the Black Rock vein. The westerly part of it has been referred to as the Jersey Blue. This vein is crossed by the Deadwood vein which faulted it and both the Deadwood and the Black Rock have been faulted by the Black Rock group of fractures extending nearly east and west. These fractures which are represented — 4, this series of older veins is represented here.

Q. Doctor, right there, I wish the reporter would mark the exhibit which the doctor is now referring to.

The sheet on which the witness marked the different events, marked Defendant's Exhibit 102; the diagram on which the witness had illustrated the various kinds of fractures marked Defendant's Exhibit 103.

A. The older series of deposits is faulted by the northwest, the Deadwood vein, and again both are faulted by the fissuring called the Black Rock group of faults, indicated by 7, on exhibit 102.
1110 In my opinion there are many facts which show conclusively that the Black Rock vein and the Elm Orlu vein merged or joined, that neither is crossed by the other, but they all represent this period of mineralization indicated by No. 4 on defendant's exhibit 102. The mineralization in these places is identical. There are small differences here and there in the same deposit, but there are no great differences in the different deposits than there are in the same deposit. That matter has been discussed fully by the witnesses for the plaintiff and need not further be mentioned. Second, the rock alteration is of the same character. The rock along the quartz seams, which is a type of the material itself, and in some places is stoped, many places is stoped. The main alteration, that is such as would be brought about by changes of the fresh granite to granite like that marked 128.

The Court: I don't quite catch the sense of that, doctor. What were you saying about it?

A. The minerals which are found in these lodes are the same, and the alteration of the rock making out originally from the lode is of the same character in all deposits of that group; it is the same kind of alteration you see from this to this (indicating).

Mr. Ellis: From the original to the altered granite?

A. Yes, sir. Third, the Rainbow lode of which the Elm Orlu is a strand is faulted by the Deadwood fault. In other words, this
1111 feature, the Block Rock vein west of the shaft is faulted by the Deadwood fault, and therefore must be older.

If it were not there, it obviously could not be faulted. Thus we have, in the correlation of these veins an additional evidence of their being the same age. Moreover the Black Rock vein may be traced continuously from the east end of the Black Rock claim through the discovery shaft westward to the west end of the Black Rock claim, and since it is traced continuously, it is obviously the same feature. It is interrupted by the faults which have been mentioned, but by faults of small offset, where there is no difficulty in recognizing on either side of the fault, vein matter which is obviously of the same age and character.

Fifth, as the Black Rock continues on its dip and on its dip, pretty regularly with little undulations, but very gentle undulations, from the surface to a point where it joins or merges into this great mass of ore which makes out over here. That can be seen at places which will be mentioned. It merges into this great ore body; it does not cross it.

There have been certain correlations made——

Q. Now, Dictor, before you take up that subject I will ask you to state whether or not you find other fracturing than the Black Rock fault and the Deadwood fault in the country generally to the easterly and westerly of the veins in question and northerly and southerly thereof?

A. There are found many fractures; scores of fractures,
1112 so closely spaced in many places that they can hardly be represented on a map even of this large scale.

Q. Do those fractures have any parallelism in strike and dip, or do they strike and dip in all directions?

A. There is great variation, although the majority of them I think strike more nearly east and west than north and south; that is certainly true.

Q. Now, in the ore bodies thus connected with the Black Rock-Elm Orlu vein, do you find any post-mineral slips connected with the ore bodies?

A. There are a great many. The most prominent one has been mentioned as the Black Rock group of faults; there are a great many; most of them I think are associated with the Black Rock period of fracturing; though there may be some associated with other periods, that is certainly the dominant thing, the Black Rock period of fracturing. That is shown by the fact that most of these fractures join the Black Rock fault.

Q. Is there any difference in the character of the gouge found in what the defendant calls the Black Rock-Elm Orlu vein, as distinguished from what the plaintiffs designate the Jersey Blue-Rainbow lode?

A. The gouge in a general way is identical. Here it may have more granite in it; there it may have more vein matter in it; but all of the gouge along the vein where the fracturing has been
1113 so close to the vein, is marked by the presence of vein matter, both in the Black Rock-Elm Orlu vein and in the Black Rock vein, or what has been called the Jersey Blue.

Q. How do the walls of these two branches or two veins compare?

A. Why, they are identical in the main. There are local differences; there are little undulations. It is a great post-mineral fracture, that is, a fracture which has followed the veining. This is a great post-mineral fracture; those fractures are full of crushed granite, crushed vein matter and finely comminuted material, which is called gouge.

Q. Now, take the north wall of the Black Rock-Jersey Blue vein, as claimed by the defendant, and how does that compare with the north wall of the so-called Rainbow vein?

A. Well, it is all called Rainbow vein.

Q. Well, I am making a distinction, Doctor, between what the defendant calls the Black Rock-Elm Orlu vein, and what the plaintiffs denominate the Rainbow vein, and the Black Rock vein which they call the Jersey Blue; is there any difference in the north wall of those two veins?

A. No, they are the same character. The gouge—as I said, there are slickensides—well, I did not say there were slickensides, but there are, and they contain ground up granite and gouge, and ground up vein matter, identical in every respect generically, although there are local differences of course. There are no
1114 two things that are exactly alike; they will have some differences in my opinion beyond any doubt.

Q. Do you find any well defined north boundary to each of these veins?

A. No; as seen from the map, this boundary grades off into a mineralized area.

Mr. Kremer: What boundary. Please designate the point.

A. It grades off into the north boundary. That shows better where we have more detail.

Q. Well, take any exhibit you desire.

A. Well, take the Elm Orlu 1300. There is no definite north wall here at this point.

Q. You are referring now to what exhibit?

A. Defendant's Exhibit 77. There is no definite north wall here; there is a merging of the ore between the south wall of what has been called the Jersey Blue vein and the north wall of what has been called the Elm Orlu vein. There is north of this a country which is not much explored. I have no doubt there are small fractures in the rock. I cannot conceive of great fractured zones being

formed and being exactly limited by a plane like that. There are points and there are bound to be little cracks on the sides at some places going through, not prominent, much less prominent than this great zone. That is shown in this block along those planes of movement. The dominant fracture is continued, but there are little fractures which break off from those main veins.

1115 Q. You may proceed with your statement?

A. There have been certain correlations made of what has been called by the plaintiff the Jersey Blue vein on the west and on the east side of the Black Rock fault. A feature which here is shown in blue on Defendant's Exhibit 65, east of section 25. That has been represented as cutting across and as being faulted by this fault and appearing on the other side. I will now refer to the Plaintiff's map of the Black Rock adit; also it is shown so much better by Professor Irving's drawing, which I will use if I may. This Jersey Blue vein, as it is termed by the plaintiff, is represented as continuing across the Black Rock fault, offsets at this point.

Q. You are now referring to Plaintiff's Exhibit 8?

A. Plaintiff's Exhibit 8; whereas, as a matter of fact the Black Rock or Jersey Blue vein continues eastward through a great zone of mineralization. It is faulted by the same fractures here of the Deadwood, but it is found on the other side of the fractures and continues as a broad sheeted zone, a number of closely spaced parallel or nearly parallel fractures extending eastward and easily followed, but offset somewhat, though with slight displacements by these northwest fractures. This part of what has been called the Jersey Blue vein by the plaintiff (referring to Exhibit 65) is correlated——

Q. State what part so the record will show it?

A. This part from about 831 to near crosscut 19, and

1116 beyond, extending to the Black Rock fault. This portion, which is not in my opinion the Jersey Blue, because it cuts the Jersey Blue and the Jersey Blue is followed eastward—that would be shown on this drawing of Professor Irving's Plaintiff's Exhibit 35—well, that would be represented by this small part, which in my opinion is not the Jersey Blue, but fractures which cross the Jersey Blue-Black Rock vein.

Now, I have drawn sections parallel to the Black Rock fault, on either side of it, about 55 feet each way. The two sections are 105 feet apart.

(Two glass sections marked Defendant's Exhibit No. 104.)

The Witness: One of the sections would be shown in a broad way by this plan here (Plaintiff's Exhibit 35), although the detail could not be the same, because the section is not quite at the point of intersection. It is a point somewhere roughly about that line. It is oriented on this model, and the model is part of the exhibit, so I do not think I need to go into that matter any further.

Q. Now, Doctor, before you go any further with your exhibits, state in detail the data from which the exhibit has been constructed.

A. Tracings were made from these various level maps showing

positions of the supposed Jersey Blue vein and a composite map showing all levels portrayed on the same piece of cloth.

Q. What level sheets or what level plan maps of the plain-
1117 tiff were used in the construction of the exhibit?

A. All of them from the surface down to the 1400 level of the Black Rock mine.

Q. Now, what plane was the section passed through, or the sections passed through?

A. The sections were passed through a plane approximately perpendicular to the Black Rock fault, at points equi-distant from the Black Rock fault. From this point to this point is approximately perpendicular. It has minor warpings but might be very well represented by both papers in this position (indicating)—this plane.

Q. When you say "this plane"——

A. This plate of glass.

Q. Where is that plane located with reference to the model; it is to the northerly or southerly or westerly or easterly?

A. It is north about sixty degrees east. That is an estimate. It is on the model though, the north arrow and the plane with descriptions of it.

Q. Doctor, I wish you would mark each of the sheets of glass so the record will show to which one you are referring in your testimony?

A. The sheets northwest of the fault is numbered—whatever you give that number.

Q. As suggested by the court the sheet lying northerly of the Black Rock fault and the sheet southerly of the Black Rock
1118 fault will designate the sheets of glass in the model.

A. We might mark them.

Q. Call it one and this one 2.

A. This section shows a comparatively regular feature. It dips, slightly, undulates slightly, but is fairly regular as is shown better by Dr. Irving's exhibit 35. It is a fairly uniform plane though we are not——

The Court: Represents what?

A. A fairly uniform surface.

The Court: What is that?

A. A prospective showing of what has been called the Jersey Blue vein from the surface downward. On the other side of this fault we do not find the same comparatively regular feature but one of undulating outline which has little similarity to the one which has been correlated on the other side of the Black Rock fault 105 feet away. It will be seen that this feature which has been termed by the plaintiff, the Jersey Blue vein southeast of the Black Rock fault has very likeness to what has been termed the Jersey Blue vein northwest of the Black Rock fault. From the surface downward it has a gentle dip to the 450, southward, southwestward, it has a—I should say this is a steep dip here; it is more a gentle dip; but it changes its dip here. Here it dips north, for instance—southwest.

Q. Doctor, when you say "here" on this section—on that
1119 section, from the surface to the 450 level, it is the dip which you have designated as the sharp dip?

A. From the surface to the 450 it is a steep dip to the northeast. From the 450 Black Rock to the 800 Elm Orlu it is a more gentle dip.

Q. In what direction?

A. Is to the southwest. From the 800 Elm Orlu to the 700 Black Rock, forty feet, the levels not being the same in both mines, forty feet difference or a little better—it dips again to the northeast and this dip is shown to continue to the 900 level of the Black Rock mine. Here again it is shown to dip in the opposite direction, southwest and again it is shown to change.

Q. At what point?

A. From the 1000 level to the 1100 level of the Black Rock mine. Again it dips southwest from the 1100 to the 1200 and is shown to dip northeast again from the 1200 to the 1400.

Q. Right there, doctor. If the Jersey Blue vein as claimed by the plaintiff here passed through and cuts the Rainbow lode, so-called, state whether or not you would expect to find the dip of this vein southeasterly of the Rainbow vein, after it had intersected it and passed through it, conforming practically to the same dip that it had northwesterly of that intersection or crossing?

Q. Right there, doctor. If the Jersey Blue vein as claimed
1120 by the plaintiff here passed through and cuts the Rainbow lode, so-called, state whether or not you would expect to find the dip of this vein southeasterly of the Rainbow vein, after it had intersected it and passed through it, conforming practically to the same dip that it had northwesterly of that intersection or crossing?

A. Not precisely at all places. The Black Rock fault is supposed to be a fault of comparatively small throw. The plaintiffs I believe have estimated its throw at something between 100 and 200 feet. It cannot be definitely estimated but I would expect two segments of the same feature, of the same vein, to be rudely similar. I would not expect in a distance of 105 feet to have changes so great as this, and I would hesitate to correlate a feature so irregular as this with one over 105 feet away having so different an outline. Moreover, in my opinion, this does not represent, in my opinion——

Q. What does not?

A. 2 of this exhibit does not represent, in my opinion, the geologic features. There is almost no mineralization in this and no minerals in my opinion along this feature that are not crushed up materials older than the fissure. There are at the various levels many other fractures which are shown on the plans of the defendant which I believe could be correlated more properly with segments of this blue line. These, then, are features that are found in many places,
1121 on all of these sections that are shown on these maps; we need not refer to them in greater detail. In my opinion, many of these probably extend in planes which make angles with the line represented. In other words, I believe that this is made up of segments of different slips, crushed zones, fractures through the Black Rock veins, and things which I do not believe are the same.

Q. Now, doctor, taking the Jersey Blue-Black Rock vein north—that is exhibit 1, sheet No. 1 of these glass sheets, sheet No. 1, how does that compare in size or width with what is shown on sheet No. 2

as a fault or crossing section of that Jersey Blue vein southeasterly of the crossing?

A. The feature that is shown northwest of the Black Rock fault on exhibit 8 of the plaintiff is about the same size and character, and both slope about the same as certain features that are correlated southeast of the Black Rock fault with the Jersey Blue vein, but on lower levels that vein is of greater size than anything I have seen which could be, with any probability at all, referred to the fracture which is called the Jersey Blue southeast of the Black Rock fault.

Q. Have you indicated on any of the maps of either the plaintiff or defendant the planes through which the sections represented by the exhibit which you have last referred to are passed?

A. They are shown on that model.

Q. I wish you would indicate it on some of the maps if you can?

1122 A. That plane passes here.

Q. Doctor, indicate that by some marking on the map so the record will show.

A. On either side of the Black Rock fault. I would like to make a statement, if I may. The co-ordinate lines of these maps are not the same as the co-ordinate lines on these maps, and there may be a variation of two or three degrees difference because I cannot orient my section with the large plane; I am orienting it with the Black Rock shaft, and that might make a difference of two or three degrees in this line.

Q. Now, you have indicated on plaintiff's exhibit 8, by the line AB the plane on sheet 1 through which the model was passed?

A. Yes.

Q. And by the line CD on the same exhibit you have indicated the plane through which sheet No. 2 on the model was passed?

A. Yes.

Q. And I understand you to say that the difference in distance between the two planes of section is 105 feet?

A. Approximately that. It can be measured across here. Do you wish me to mark it on all of these?

Q. I understood you to say, doctor, when you were describing this model, that these planes of sections have been passed from the surface to the level?

A. Yes, vertically, passes through all the sheets as shown on the model.

1123 The Court: This is supposed to represent a section of the point on the plaintiff's level map this vein would pass through?

A. Yes, all of these maps. I didn't understand you whether I should indicate that line of this section on one map or on all of them?

Mr. Ellis: That one will do, doctor?

A. Perhaps it would be well to show it here?

Q. You are now referring to plaintiff's exhibit 11?

A. Yes.

Mr. Gray: Professor, I wonder if you would object to this little tracing you are using as an exhibit being offered in evidence?

The Witness: Not at all.

Mr. Gray: I would like to have this marked to assist us if any one wants to compare it they will be able to.

The Witness: I think you should take the other tracing which shows the rest of the same. I used two tracings because it was hard to get all of these on one because this feature is found one place over the other.

Mr. Gray: I have no objection to that.

Said tracing was marked Plaintiff's Exhibit 105.

The Witness: I wish to say also that these are composites of all the tracings that were made from the plaintiff's exhibits on that roller.

1124 Mr. Ellis: Showing the workings from the surface to the deepest level?

A. Yes. I would like to say I put them on two papers because it was so hard to use one and make out the different features on the different levels, so if they would be put on over the other it would give a projection as if you were right over that lode and looking down; it would give the projection, put one of these other—put one of these over the other, it would give a projection of all levels from the surface to the 400.

Mr. Ellis: I would like to have this tracing marked also.

Another tracing was marked Defendant's Exhibit 106.

Q. On exhibit 11 you were placing the positions of the planes through which the sections would pass on that exhibit, and I will ask you to state whether or not the plane of section as indicated by the letters EF northwest of the so-called Rainbow lode and by the letters GH further west——

A. EF represents what is marked 1 on this exhibit and the other plane what is marked 2.

Q. Now, doctor, do I understand, in arriving at the dip of this vein, both as shown on sheet one and sheet two on the several levels through which the section has been passed, you have connected the points where the section cuts the so-called Jersey Blue vein northwesterly of the Rainbow lode, and on sheet 2 have you made

1125 a similar connection between points on the several levels where that Jersey Blue southeasterly of the Rainbow lode has been encountered; is that correct?

A. This section shows the point at which the vein is shown to cross on the plaintiff's exhibits.

Q. Referring to sheet 1 of the model, are you?

A. No, I think it is sheet 2 of the model. These points have been portrayed at various levels where what they call the Jersey Blue vein is found, these have been portrayed in all the workings available that were connected between them. There is an observation here, an observation of what I believe is something else.

Q. When you say "here" that doesn't indicate anything for the record. Just indicate the point.

The Witness: I think I have some notes on that. On or near the surface there is an observation on the Black Rock tunnel level of the feature——

The Court: I think the doctor has fully explained that. This line represented the line of the Jersey Blue as shown on the level maps of the plaintiff. Is that right, doctor?

A. Yes, that is what I mean. If the court desires, I can state what I saw on it at each of these points—not at each of these points but on the levels near each of these points where that crosses.

The Court: I don't think that is necessary; I think you have stated it.

Q. Doctor, take the 450 Black Rock and indicate what you have observed there as to whether or not the Black Rock Jersey
1126 Blue vein crosses the so-called Rainbow vein, referring to Defendant's Exhibit 67, and Plaintiff's Exhibit 18?

A. On the 450 level of the Black Rock mine in this drift called 456 there is a feature which may be represented thus (drawing); a strand of the Black Rock fault cuts the ore body, giving an exposure like that. This strand has been correlated with the segments of the Jersey Blue southeast of the Black Rock fault on the exhibit of the plaintiff. It has also been shown in court; approximately at this place a drawing has been made by Mr. Searls, illustrating the same feature. This has been termed the Jersey Blue vein.

Q. Indicate what you speak of?

A. The feature which is drifted upon by 456 has been termed the Jersey Blue vein.

(Sketch marked Defendant's Exhibit 107.)

Q. And you have indicated that by the upper blue line of your sketch which you are now making?

A. The blue line from A to B. One can follow that in the workings east, that is, you can follow this feature; first in cross cut 451 there is a little quartz and a little vein a few inches wide which comes into just the position with this feature which is followed along drift 456, and following this westward it is seen to curve around—the gouge may be observed in the roof to curve around and extend in a westerly direction.

Q. West or southwest, doctor?

1127 A. It is a little south of west at the end. There is a little slip here. Blue means gouge and red means vein matter—there is also some crushed material along this strand of the Black Rock fault which is represented from A to B, but no ore which has not been disturbed. It is ground up material, fragments of granite, fragments of vein matter ground up in the gouge, and over the drift one can follow for several feet continuously around this curve the Black Rock fault or the strand of the Black Rock fault where it is seen to turn off in a direction slightly south of west. This, which has been termed by the plaintiffs the Jersey Blue vein southeast of the Black Rock fault, is in my opinion later than the mineralization of the country, and is to be, I believe, properly correlated with this

Black Rock period of faulting, number seven, on this Exhibit No. 102.

Q. Is that all you have to say with respect to that alleged crossing there?

A. Nothing more, except that this is a fault from A to B, and is not a vein.

Q. Do you find anywhere on that level southeasterly of the so-called Rainbow lode any part or portion of the Black Rock vein which is intersected and passes to the southeast of the southerly boundary of the so-called Rainbow lode?

A. No. There are some 15 veinlets and small veins from the shaft to the 508 drift.

Q. In what crosscut?

A. In the 451 crosscut, but nothing which presents the
1128 features of the Jersey Blue segment northwest of the Black Rock fault.

Q. Now, take the tunnel level, doctor, and state whether or not you have observed anything which would justify the conclusion that the Jersey Blue vein so-called has intersected and crossed the so-called Rainbow lode, referring to Defendant's Exhibit 65.

A. The Jersey Blue vein has not crossed the Rainbow lode on the Black Rock adit level. The Jersey Blue has been followed in a drift about 80 feet northeast or approximately north 60 east from station 831 nearly to station 786. There it is faulted by fractures which strike in a northwest direction and which are to be correlated with the Deadwood fault, the sixth feature mentioned in connection with the outline of the geology of the region in Exhibit 102. There it has a slight displacement. The ore is in just the position, or essentially so. It may be followed in the short drift in which station 787 is shown. There it is faulted off again by another parallel fracture, which strikes northwest, and which is to be correlated also with this Deadwood fracture period, a splitting up of the fracture of the Deadwood, very much like the Black Rock fault itself splits up at other places. It may be carried also eastward to this great body of quartz. Here this is a broad——

Q. This great body of quartz does not mean anything, doctor?

A. The great body of quartz on which 808 station is seen.
1129 In this place the lode partakes more of the character of a sheeted zone. There are many closely spaced nearly parallel fractures extending in the direction of the Black Rock vein in an area which is very highly altered by the vein forming solutions which deposited the quartz stringers, which may more easily be followed because they are more definite. It may be followed eastward to this great mass of quartz which has been referred to, in which station 808 is located, and through a zone of intense mineralization with many fragments of quartz, but somewhat disturbed, in the region between cross cut 11 and the east end of this thing that is not numbered.

Q. Which runs easterly from station what?

A. From station 54. It may be followed thence to the discovery shaft in the working of the Niagara level eastward, where it passes out

of the east end line of the Black Rock claim near the northeast corner of the claim.

Q. Did you find anything in the work running easterly which shows on Defendant's Exhibit 65 through the letter "E" in the word "Elm", immediately below which workings are found the figures 25 at the westerly end and 25 at the easterly end, which could be correlated any way with the Jersey Blue-Black Rock vein lying to the northwesterly of that so called Rainbow lode as claimed by the Plaintiff?

A. No, I did not. You asked me first if I found anything,
1130 and then you asked me if I found anything to be correlated. I did not find anything to be correlated, but I did find some things.

Q. Well, what did you find?

A. There are a number of irregular fractures which are shown on the map in cross cut 25. There are also small bodies of quartz about as big as one's hand, or perhaps a little larger, which are often in two or three places in these workings, but which generally strike in the direction of the Black Rock vein, and which I have no doubt are small bodies of quartz or veinlets such as are found in many places in the two mines.

Q. Now, take the 700 foot level of the Black Rock, Defendant's Exhibit 70, and state whether or not you find any evidence there of any crossing of the Jersey Blue-Black Rock vein by the so-called Rainbow lode?

A. No, there is no evidence that the so-called Jersey Blue crosses at this point, or that any vein crosses the Rainbow lode at this point. At this point in 702 drift, Exhibit 70, there may be seen, extending from 701 cross cut to 704 drift a fracture or fissure along the sides of which there are bodies of quartz; indeed there is an almost continuous mass, I think, although I have not followed every foot, but I see here and there bodies of quartz from station 751 to a point about 20 feet east of 817, bodies of quartz continuous.

Q. What size are these bodies of quartz, doctor?

A. They vary from about 8 inches to a foot; there may be
1131 some that are larger, but I don't think there are any that are larger than a foot—I have not seen them.

The Court: You mean in thickness?

The Witness: In thickness, in width. They represent what I deem to be a vein which may be—the fissure is in the vein at some places; the fissure is south of the vein at station 751. Near the raise in 702, a little east of the raise, there is some vein matter, and I have no doubt that this fracture from A to B follows the vein and crosses it and to some extent slickensided it;—it does not slickenside it, but cuts it very sharp; you cannot get a polished surface, but you can get very sharp planes, but not polished. This fissure is later than the vein, and should be so shown. In the stopes 19 feet about this level I observed in the first week of April, 1915—the stopes are changing and that particular point is not there now of course—I have seen the same feature approximately that was described by Mr. Searls last

week, and I am drawing it (second drawing on Exhibit 107) approximately as he showed it, with one exception, and that is this, that I have not seen any vein matter in this feature to a point near the east end of the upraise from 702, but there is some vein matter along it like that. At the point of intersection, or at the point where this ore body is cut and displaced or faulted by AB, there is no vein passing through; there is nothing but crushed up finely comminuted quartz and other vein matter and granite. There is
1132 no vein passing through, but a post-mineral fracture, which, through part of its course, follows this vein, and through a part of its course diverges from the vein.

Q. When you say this vein, you are referring to the vein you have indicated on the second sketch you have made on Exhibit 107?

A. Yes, the vein from A to B, but which is not represented at this cross cut. It probably leaves this; where, I do not know. My opinion is that the vein between A and B join- this other lode at some place, but I don't know where; the workings do not show, but it is not a feature which goes through the fault represented by the Line CD. That is shown very clearly at survey point 751, where I will sketch the geology to show the relation there where that may be seen today. (Third sketch on Exhibit 107.)

Q. Doctor, before you start in on this sketch, I will ask you to number the sketches on this Exhibit 107 as 1, 2 and 3.

A. All right, I have so marked them. This is sketch No. 3 on Exhibit 107, and is a sketch of the face as one sees it now at station 751. Here is the vein. The vein shown in the sketch is about 8 inches wide. It crosses granite, and has slightly altered the granite, but there is no crushing between the vein and the granite, and it is in no sense vein matter; it is not gouge; it is altered granite.

That is the material that is found in what is shown by 3,
1133 exhibit 107, at a point about "X", granite that is not gouge in any sense, not ground up. The fault which may be represented as 3 strands in the zone of fissuring at this point, crushes up the ore at the bottom where it unites with it, but does not come inside of the fault that faults this part of the Rainbow lode in the stopes 19 feet above 702 drift.

Q. The specimen that you exhibited to the court I have marked E4 of altered granite. Now, have you anything further to say about what you observed at the point you have designated?

A. This fault follows a vein from this point—at this point—this fault follows a vein from A to B.

Q. On the sketch 2?

A. On sketch 2 of exhibit 107, but none of the places through the ore bodies designated by "EF." There is crushed vein matter and granite about four inches passing through there. The vein AB has evidently left this fault plane and perhaps joined here—we cannot say what has become of it. That CD is later than the vein is shown by its divergence at this point and by the fact that it crushes the vein at a place where one can see it exposed at 751 station.

The Court: What vein have you there represented by EF; the Rainbow?

A. Yes, sir. This is it on exhibit 70, the vein which is faulted is shown by drift, exhibit—drift 704.

Q. What vein is represented by XY on sketch 3 of exhibit 107, doctor?

1134 A. A small fissure vein which I think at some places joins EF, but which I cannot, further than that, identify. These fractures so commonly follow veins where they are properly spaced in the country because the plane of weakness between the vein and the country rock is one which coincides with the quartz and the country rock. I think I can state that more clearly; because the plane between the walls of the vein and the country rock is a plane of weakness, fissures very commonly take these planes when they are properly spaced.

Q. Will you indicate by exhibit 70 where your sketch 3 is supposed to lie?

A. It is approximately 19 feet above station 779 in the stopes which were being run in the first week of April, 1915.

Mr. Gray: Is that right there?

A. Right here.

Mr. Gray: This one?

A. No, I thought you meant this one. This is the point where this is.

Mr. Ellis: It is indicated to be the cross cut approximately at station 751?

A. Station 751.

The Court: Confined to this cross cut?

A. Confined to this cross cut—well, it is the side, it is a face as you stand back and look at it, it is what you see in that cross cut.

1135 Mr. Gray: You mean the face of the drift, professor?

A. Yes, it is the face of the drift and it is in the cross cut, along the side.

The Court: I suppose what you call cross cut is really a drift there?

A. Yes.

Mr. Ellis: Now, doctor, what relation, if any, does the fault CD in your opinion, bear to the Black Rock fault?

A. I think it is a strand of the Black Rock fault.

Q. And it is a strand of the Black Rock fault on sketch 2?

A. Yes.

Q. You have designated as BC the strand which faults this Rainbow lode?

A. Yes.

Q. As you have illustrated on sketch 2 of exhibit 107?

A. It is.

Q. Is there anything further, doctor, that you have to say with respect to this 700 Black Rock, exhibit 70, with reference to any crossing of the so-called Rainbow vein, of the Rainbow vein?

A. No, it is — my opinion not a segment of the Jersey Blue. I think I made that clear.

Q. Is there, anywhere that you have observed, from the surface to the deepest level of either of these mines, where the so-
1136 called Jersey Blue vein has intersected and crossed the so-called Rainbow vein, either upon its strike or dip?

A. There is not.

Q. I understood you to say, doctor, that you had traced on the surface the apex of the Black Rock vein to and across the end line of the Black Rock claim. I wish you would state in what that tracing consisted and refer to defendant's exhibit 64 in making your statement?

A. I would like to refer to my notes.

Q. Very well.

A. On the——

Q. You are now referring to exhibit 66?

A. On defendant's exhibit 66 showing the Niagara tunnel there is represented a vein which extends approximately from station 1093 southward about fifty feet.

Q. Southward from the station?

A. From the station. That is a broad zone of mineralization of altered granite which contains a number of closely spaced parallel fractures which are filled with vein matter. At station 1093 the vein may be seen. There is no quartz and the granite is not very much altered until one reaches a point about ten feet south of 1093. From that point south about 35 feet the granite is highly crushed and altered and contains bands of quartz which strike off in a direction about north 60 west. One cannot follow these bands of
1137 quartz continuously, but the broad zone of mineralization is very clearly defined and definite. There is one vein which is almost continuously exposed, though not everywhere exposed, which can be followed to near 1110.

Q. That is followed in the work extending from the mill tunnel cross cut westerly from station 1092 to 1110; is that the work to which you refer, doctor?

A. Yes. I have not followed it every foot of the way. There are places where I have not noted it, but the broad zone of mineralization without any doubt exists there and strikes approximately as stated.

Q. Now, coming westerly from that point, where—what did you find in these workings?

A. From the discovery shaft?

Q. Continuing on westerly from the point last mentioned?

A. I beg your pardon. I thought you said coming westerly. One finds this mineralization extending to a slip or plane which may be a fault or which may be a pre-existing fracture, I am not certain, but this vein continues and lays up against a great mass of quartz which is found here and here (indicating).

Q. Is it that—is that point marked on the map "shaft"?

A. It is not marked.

Q. Westerly of station 1119, about thirty or forty feet?

1138 A. No, not that much. About fifteen feet west of 1119.

Q. And from the northerly side from where the cross cut appears on the map, northwesterly?

A. From the crosscut, following this fracture or plane, the surface is marked in blue from the shaft. From this point west there are great stopes on the surface, caved—caves formed by the stopes where the ore had been taken out below, and a vein material can be followed westerly to a slip which is on section 31. There are no stations marked there. There the vein matter is exposed as a great body of considerable size in the drift which crosses section 31. There is a little quartz also here (indicating), but the great mass——

Q. What is that?

A. There are no stations.

Q. In the work running southwesterly from station 1147?

A. Yes. But the great body of quartz is north of that point about twenty feet. Westerly a body of ore which has been stoped continues to the discovery shaft and is marked by a great—and the workings show numerous old mine timbers and "gob" which has obviously filled up the ore stopes some years ago.

Q. How far beneath the surface is the mineralization that you observed in the crosscut running southerly from the mill tunnel, and the work running westerly from that crosscut which you have just described?

A. I don't understand you.

1139 Q. How far vertically beneath the surface are these workings that you have just referred to?

A. It is very near the surface. I can't give you that accurately, but I can show you from the model and I think I can estimate it very closely. I should say ten to twenty feet.

Q. From the surface?

A. Well, wait—from eight to twelve feet, that is more accurate. It is shown—that is the mill at its level and this is the surface above it.

Q. I notice, doctor, that the mill tunnel cross cut to which you have referred is some number of feet westerly of the east end line of the Black Rock. Were you able to trace mineralization on the surface to and across the east end line of that claim?

A. In the mill as shown over on this point——

Q. Now, by "this point" you mean——

A. There are quartz veins south of the east end of the mill which belong I think to the same zone of mineralization.

Mr. Gray: Before he leaves the model can't he mark this one he has just pointed to.

Mr. Ellis: Mark that on the block model, the one you pointed to.

A. Approximately here.

Q. Mark it with your initials.

(Witness indicates.)

Q. You have marked it the place called for by Mr. Gray?

1140 A. Yes.

Mr. Gray: At the other end.

A. I have seen nothing at the other end.

Mr. Ellis: You have marked the point called for by Mr. Gray or the line called for rather, with the letters "XY" and opposite the letter "X" your initials, have you, W. H. E.?

A. Yes, sir.

Q. Do you find the same mineralization at the point which shows the stock work and the two little veinlets lying northerly of the little veinlet which you marked at Mr. Gray's request—do you find any mineralization as indicated upon this block model lying northerly of the point you pointed out to Mr. Gray, where the letter "X" is, upon the surface?

Mr. Gray: I don't like the form of that question. The witness pointed it out.

Mr. Ellis: I didn't say you pointed it out.

A. I haven't seen any, but the ground is covered there. There may be little stringers running in there; I should think there might be.

Q. I am not referring to the mill tunnel lying northerly of the Black Rock claim. I am confining your attention to a projection of the mineralization from the crosscut in the mill tunnel to and across the east end line. Did you find any mineralizaton there that in your opinion is part and parcel of the Black Rock lode, at the surface?

1141 A. Why, the mill tunnel is approximately the east end of the claim.

Q. There is a space there of a few feet and I want to know whether that intervening space is mineralized, as you saw it?

A. There is a little vein on the surface, in the corner of the mill, a little thin quartz vein.

Q. And the point to which you are referring as shown on the block model is indicated how; put some identification—put some identifying mark here.

A. This mill seems to cover a great deal of ground.

Q. Indicate the place where you saw it crossing the east end line.

A. May I ask one question: Has there been any additions made to this mill on this end?

Q. Can't you refer to your notes, doctor, and tell what you observed there?

A. If there has been an addition to this mill I can't locate that exact spot. I went there very hurriedly.

Q. Did you know where the east end line—irrespective of the mill—did you know when you made your surface examination of the outcrop, where the east end line of the Black Rock claim was?

A. No, I did not.

Q. Doctor, this morning in describing the mineralization that you found in the workings westerly from the crosscut at the mill tunnel shown on exhibit 66 of the defendant, you stated that you traced the

mineralization from point to point. Did you mean by that
1142 that you did not find continuous mineralization, or what did you mean?

A. From the point marked 1093 to the one marked station 1111 part of the drift was lagged and I did not follow every foot of that vein, but I think there is a vein there.

Q. And due to the lagging of the drift, you meant by that that you didn't see it every inch of the way?

A. No, I didn't have the lagging taken down.

Q. But you did see it at intervals sufficiently close so as to be able to state in your opinion it is a continuous vein passing the point you have last mentioned?

A. Yes, and the alteration of the rock is such as would indicate the presence of a vein.

Q. Doctor, during your examination of these properties underground, did you examine them in detail from the highest to the lowest level, so far as they were accessible at the time of your examination?

A. Yes. I went into practically all the workings and mapped the geology in practically all the workings that were made up to about the first of September, but there were some workings, for example, this, there was bad air in this——

Q. You are referring to what region?

A. There was bad air in the workings below the Elm Orlu adit—that is not it.

Q. You are referring to exhibit 65?

A. This curious, curving, dotted gallery or drift between section 21 and a point about 160 feet west of it, I didn't go into that,
1143 and I didn't go into a little shaft here.

Q. How designated on the map?

A. Little shaft north of 5 of the Black Rock or——

Q. In the Jersey Blue vein of the——

A. Not the Black Rock adit. It was this adit from the Dewey, to that point. I didn't go into that tunnel north of 5, and this one north of 4.

Q. Marked "gulch tunnel" on the map?

A. Marked gulch tunnel. And in the easterly part of the Black Rock mine because the shaft—I didn't do very accurate or careful work because the caving of the stopes was so much and the ground had been changed—it is very heavy ground, old work closed up some and it didn't seem to me to be a place of very great importance. The other parts of the mine I visited with great care and made maps.

Q. Did you examine what is known as the Pyle raise from the 700 up?

A. Yes, I followed the Pyle raise from the 700 to a point about 220 feet above the 700 foot level of the Black Rock mine.

Q. Possibly you could refer to the block model, doctor, and the section?

A. That is section 28. I followed that raise from the 700 to a point 220 feet above the 700, which would be about 30 feet below the 450 level of the Black Rock mine.

Q. Now, just describe what you found in that raise and
1144 what your opinion is as to its upward extension?

A. I climbed up that raise; I noted quartz on the south side of the raise 16 sets up and 24 sets up.

Q. From what level?

A. Above the 700 level of the Black Rock.

Q. Point that out on section 28 of the block model.

A. It was there.

Q. By "there" you have indicated on section 28 of the block model where I am now holding the pointer the first point that you mentioned?

A. 16 sets up, yes, sir; also approximately there.

Q. Where I am holding the pointer, that is 24 sets above the 700?

A. Yes, sir.

Q. Now, I wish you would state anything *a*lse you have to say respecting the upward extension of the mineralization you saw in that raise, and where, if at all in your judgment it would continue?

—. The Pyle strand, as it has been called has been described fully by the witnesses for the plaintiff. Below the 700 foot level I think I have nothing to add; but at a point 220 feet above the 700 foot level of the Black Rock I mapped the floor of the raise. There were timbers at this point, and I could stand, and the workings extended about 10 feet above my head. I mapped the features I saw on the floor, and I have here an enlarged sheet or drawing of the Pyle raise.

(Drawing marked Defendant's Exhibit No. 108.)

1145 Q. What do you call this, doctor?

A. An enlargement of a map of the floor of the Pyle raise 220 feet above the 700 foot Black Rock level, marked Defendant's Exhibit No. 108. This heavy black line of the drawing is an enlargement of a section which would be cut across the raise.

On the floor there are shown four small veinlets. The co-ordinates are placed at intervals of one foot, and this vein is——

Q. What vein?

A. The vein in the southwest corner marked "X," is about four inches wide. There is another vein one inch wide located in the northwest corner trending from the northwest to the southeast.

Q. Of the raise?

A. No, the raise would be this here, across the raise. Trending from the northwest corner of the raise southwest at an angle about——

Q. You mean southeast, don't you?

A. Yes, I mean southeast,—north forty west. The two other veins are shown striking about south fifteen east and south thirty east or north thirty west.

Q. What is the coloring in blue intended to represent?

A. The coloring in blue represents crushed granite and gouge, ground up granite with some vein material in it. I don't think it represents a very strong feature though it does show crushing and gouge.

Q. The red?

1146 A. The legend shows. The red is vein matter and the blue coloring granite and crushed vein matter.

Q. Have you indicated the dip of the several veins?

A. Yes, the dips of these veins are indicated.

Q. What is the dip of the first one mentioned?

A. Sixty-nine degrees.

Q. In what direction?

A. Southwest.

Q. And the next one?

A. I see that there is no dip marked on that, but I may be able to put the dip on it. I am not sure.

Mr. Gray: You have got it vertically, haven't you, here?

A. The red varies somewhat. Over here it is eighty-five.

Mr. Ellis: When you indicate over here——

A. The northwest corner of the map.

Q. And you have indicated on defendant's exhibit 108 with the arrow pointing to it, the degree of dip and the direction of dip?

A. The degree and direction are shown.

Q. Now, have you anything further to say respecting exhibit 108?

A. Yes. I am now referring to exhibit 67 of the defendant. At that point on the crosscut extending from 451 crosscut to the Pyle raise——

Q. And in which is found survey station 1154?

A. And in which is found station 1154, there is a zone of closely spaced veins approximately the same size as these shown here
1147 and dipping approximately—dipping the same direction and with approximately the same dip, though there are variations in dip. The strike is approximately, though not exactly, the same. As is seen here these veins strike in different directions, but there is a general northwest trend shown on there, and there is a general northwest trend here.

Q. In your opinion can the vein which you have described and platted on exhibit 108, in its upward extension be correlated with the vein which you have found in the drift you have last mentioned, in which station 1154 is found?

A. Yes. The zone of veins, not each individual vein. There are twenty feet between which I have not seen. I could see to the roof ten feet above the floor I am at; I could see these veins above that point, but I didn't trace each individual vein through and I couldn't say any zone which is so irregular which has several veinlets closely spaced, that any particular vein on exhibit 108 corresponds with any particular vein on exhibit 67.

Q. But do you consider that the zone in which these veinlets occur and which you found and have platted on exhibit 108 can be correlated with the zone of mineralization which *which* you say you found in the drift in which station 1154 occurs?

A. It can. The correlation is only through twenty feet of unknown ground, and I know of nothing else on either side that
1148 may be those features which have been described in exhibit 108.

Q. What is the dip of the vein you found in the drift in which occurs 1154 survey station?

A. About sixty degrees; it varies.

Q. And what is the course of that zone of mineralization?

A. Approximately northwest.

Q. Did you say the dip of that is southeast?

A. Southwest I meant. If I said southeast it was in error.

Q. Continuing on its upward course with that dip, where would that zone which you correlate with the zone of mineralization which you have in the Pyle raise have its apex or top?

A. The zone is so irregular that it may not be positively identified above. In my opinion it is the vein which is shown in drift 4 of the Clark tunnel on exhibit 65. That correlation I regard as tentative; I don't know where these fractures go, but that seems to be the most reasonable hypothesis since there is very little that is quite so—very little that can be mistaken; there is nothing that can be mistaken for such a zone in the Clark tunnel, either north or south of this zone. However, I should like to say that the distance between these two—between the place at which these observations were made is south 400 feet, and veins which are so small and irregular and fractured
1149 somewhat, I should regard that correlation as somewhat dubious.

The Court: Is that the same place where Mr. Finch said it was mostly conjectural?

A. I think so; I am not sure, but I regard it as conjectural.

Mr. Ellis: How does the dip which would have to be extended to make that correlation compare with the dip of the so-called Rainbow vein in other places where there is no question about the vein material?

A. It is the same general dip at rudely the same angle, but not exactly the same angle.

The Court: Where you have placed it on exhibit 65 is where the plaintiffs have been inclined to call it the Jersey Blue, southeast of the Rainbow, isn't it?

A. Yes, your honor, but I doubt very much whether these small fractures that are shown on 25 crosscut can be with any degree of certainty correlated with this feature. On the other hand I am not sure that it does not. It may do so.

M-. Ellis: Have you found any copper minerals or copper ore in the so-called Rainbow vein?

A. I have. I should like to see a sheet from which I reproduced these drawings. I had some notes of places where I had seen copper which will save time. I have a catalogue of observations of mineral in various places that I have made and I can find it in a min
1150 ute. In the 1300 of the Elm Orlu copper minerals——

Q. Just pull down the 1300 Elm Orlu.

A. I cannot give that location any more accurately than to say that it was near 44—77—5, found on Exhibit 77.

Q. That is, near what is marked as a winze or raise in a working running northerly and southerly, known as 1307 cross cut?

A. Yes.

Q. The most southerly of the two raises?

A. Yes.

Q. What kind of copper ore was that, doctor?

A. Bornite and sphalerite, and a little chalcoyprite and *shown* also and chalcosite.

Q. Was there any considerable amount of that character of ore?

A. No, just a little.

Q. Was there any place in the so-called Rainbow vein, any other place that you found copper mineralization?

A. Yes, at a point near station 80 on the same level I found some copper minerals in the material which the miners had been mining; it was not in the wall, but it was in the material they were mining.

Q. In a drift running easterly from 1303 cross cut where station 80 is found, you found some copper ore?

A. Yes.

Q. Any other place where you found copper ore?

1151 A. There is a little chalcopyrite in the Jersey Blue strand, what has been so called by the plaintiffs; I cannot locate it any more accurately than that, but with the sulphides of the zinc and other vein matter there is some chalcopyrite. That is east of the raise from the Black Rock to the Dewey tunnel, between Section- 21 and 23. I have no more accurate notes than that. I think it has been referred to already by the plaintiffs.

Mr. Ellis: I desire to offer in evidence the sketches which have been marked as exhibits in the testimony of Dr. Emmons, and you may cross-examine.

Mr. Kremer: I think at this time, if your honor please, it is proper to call the attention of the court to the fact that there are some small differences between these models, as agreed by counsel, the structural differences, which involve only the wire supports, and that the defendant's model extends 200 feet east of the Elm Orlu model, so that the mill tunnel and other workings cannot be shown complete on the Elm Orlu model. The position of all the workings on the Butte & Superior model is 220 feet south of the position on the Elm Orlu model, as referring to the south side line as a base, so that some north workings, as the 1200 Black Rock cross cut do not appear on the Elm Orlu model because of that difference in location.

The Court: They occupy the same relative position with reference to the side lines, do they?

Mr. Kremer: Yes, sir. The extension of the McLeod drift and cross cuts on the Butte & Superior model are more recent than

1152 the date of the delivery of the Elm Orlu model, near the surface here, and for that reason they do not appear. The raise No. 1012 from the Black Rock on the Butte & Superior model does not appear on he Elm Orlu model. The 1416 Black Rock cross cut does not appear here, but it does appear upon their maps. The raise from the 1600 to the 1400 Black Rock does not appear. That I think is due to an elevation of this model above the base. I don't know that these differences change the situation at all, but they are these raises here upon the east end. A short cross cut north from

the Pyle raise below the 450 Black Rock on the Butte & Superior model is left off the Elm Orlu model; I think that is purely an oversight. A short drift behind the same point was not supplied to the model maker in time; that is this one here. The note I read, "Was not supplied in time" is from the model maker's note. Those are the substantial differences; any other differences would be minor detail. I asked the maker of the model to supply me with a statement of what these differences consisted of, and that is it. I will give the plaintiffs this paper.

Mr. Gray: Thank you; we have a copy of it.

Cross-examination.

By Mr. Gray:

Q. Referring to this horsetail structure on Exhibit 103, you called attention to the fact that there are two fissures represented
1153 by the longer red lines, and that there are small fractures between them, which goes to make up one vein. Am I to so understand your testimony?

A. One vein? No, not at all.

Q. How many veins does that structure represent?

A. The veins may be distinct at other places. This so-called horsetail is a comparatively local phenomenon, and can be well represented in this map here, Defendant's Exhibit 78, and better by the 1300 foot level of the Elm Orlu, which I would like to see.

Q. All right; now let us get back to your theoretical drawing that you have exhibited on Exhibit 103, this horsetail fracture as you call it. Do you desire to be understood as indicating that the two long red lines running in a northeasterly and southwesterly direction upon the exhibit represent separate veins?

A. In part. Extending in this direction they may be distinctly separated. In the area between there is so much fracturing and interlacing—I have drawn perhaps a dozen, but in between are cross fractures and many, in fact, countless fractures, making a whole zone of mineralization, which joins from one fissure to the other and locally connects them there, but does not necessarily connect them throughout their strike.

Q. Does this local connection make one vein out of them according to your judgment and your understanding; yes or no, and then explain it?

A. No, it does not. There are distinctly two veins shown
1154 here. These might extend out here as distinct veins.

Q. That is shown on Exhibit 103, your horsetail structure sketch No. 3?

A. Yes. I think I would like to make that more clear. While these fractures may be encountered everywhere, they may diverge either to the northeast or to the southwest and become comparatively distinct features, and the place where they diverge cannot be accurately located; it would be marked by less numerous and less closely

spaced fractures of the same general origin and character, but not so numerous.

Q. But these cross fractures that you have referred to in your judgment do not make one vein out of the two distinct fissures?

A. No; they make an ore body between them, and one cannot tell where the border—at some places one cannot tell where the border or the limiting zone is; but there is a pretty definite limiting zone outside of these two master fractures.

Q. Where is it indicated?

A. Within the walls of the fractures.

Q. How are they indicated under ground?

A. It happens that in the places referred to there are generally gouges, or fading off of the mineralization. In most places there are gouges.

Q. Suppose you put now on this Exhibit 103, on this horsetail structure of yours, the gouges that represent the walls of the vein?

1155 A. (Drawing.) There would be gouges there and there. There might be a gouge there; it appears where those fractures follow there are certain gouges through and fractures through long after the ore, and then fractures came in many directions. In the mines under discussion they are along a general northeast strike.

Q. What made these gouges there, the walls that you have referred to, not confusing them with the other?

A. Movement since the ore was deposited.

Q. Movement of the ore against the granite?

A. Some places ore against ore, some places granite against granite, some places ore against granite, depending upon the direction of the fractures.

Q. In other words, the walls of the vein have been determined by the movement since the ore was deposited, professor, according to your idea?

A. Not at all, not at all; the planes of movement follow in general the outlines of the ore body, because they are lines of weakness.

Q. You said that the limit, for instance, on the north of that northerly fissure would be a wall with gouge upon it?

A. Exactly, yes; but may I explain?

Q. Yes.

A. The fact that that is a wall had determined the direction of the fissure, not the direction of the fissure determined that that is a wall.

1156 Q. The fact that that is a wall has determined the direction of the fissure?

A. Yes, in general. Now, that is not precisely accurate; that fissure may diverge, as is shown on these maps in many places; it may go into the ore and may go out; it is merely a general coincident.

Q. Well, do you want the court to understand that this blue line which you have said represents the wall of gouge, not the little cross fracture——

A. There are other blue lines there.

Q. But the wall I am speaking of—that the blue line here represents the wall of a vein which was formed after the deposition of all of the ore in the vein?

A. The blue line which follows approximately the outline of the ore bodies represents a fracture which was formed after the ore?

Q. Movement along it?

A. Oh, yes; the Black Rock fault. If you wish to illustrate this, deposits in this zone must be due to the Black Rock fault; is frequently the limiting plane.

Q. Do you call all of the gouges and all of the vein fault movement in this ground in controversy which you have observed a part of the Black Rock fault?

A. No, why certainly not. There are many we cannot correlate with anything, scores of them.

Q. All that you found along the walls of the veins, are they a part of the Black Rock fault?

A. All I can think of are. Before going further may I
1157 look at a few of these sheets? If there are any exceptions I would like to point them out.

Q. Yes.

A. They are all faults which I believe are referable to this Black Rock period, but perhaps a few exceptions. This Deadwood is not, and there may be others. I would like to see the adit level. There is a limiting fault——

Q. That is the Deadwood?

A. Yes, that is not correlated with the Black Rock.

Q. Does it form a wall of a vein any place?

A. Why, it cuts off a vein, you can call it a wall—if you mean where the wall ends.

Q. All right. That ends on its onward course through?

A. Yes.

Q. Now, just take a piece of blue chalk, professor, and show us the wall of the older fissure, the southerly fissure of the two you have indicated in 3.

(Indicating.)

Q. No, you needn't use the maps in making that. I want to see where the gouges are you have found in that fissure?

A. I will put it wherever you wish me to put it; it may be anywhere.

The Court: He is treating that as purely hypothetical. There may or may not be.

1158 A. There may or may not be. I can put it wherever you like.

Mr. Gray: I want from your general observation where you would find two fissures connected by cross fissures, where you would find the gouge on the fissure below?

The Court: You are getting back to the particular now.

A. It is most likely to be about there; maybe out there, or it may cut through; but in general it has a tendency to follow the wall.

Q. To follow that fissure?

A. Follow that fissure—to follow the outline of the material that is deposited in and along that fissure. That old fissure we cannot locate accurately because these ore bodies have been deposited very largely by replacement and what was once the original fissure may not at all represent what is now the ore bodies. May I illustrate?

Q. Yes.

A. This may be the original fissure (indicating).

Q. That is the sheeted zone?

A. Let's take another one so we will not complicate matters. (Illustrating.) If this represents the original fissure, the ore bodies, after replacing it may be represented rudely something like that (indicating).

Q. That is as the blue shows?

A. Yes, that is not very good. The mineralization makes out along through small fissures and joins in the country rock;
1159 it even permeates the granite itself. If you take a piece of granite and boil it in red ink we find that the red ink extends into the granite a short distance; and these solutions are believed to have done the same thing, they permeate the granite to a certain extent, took certain materials away and left certain materials in the granite, and this plan is quite irregular, but these fissures have a tendency to follow it, because it is in a way a zone of weakness and a later fracture would tend to follow along that great mass.

Q. How far below into the country have you observed those cross fractures extended from one vein or vein fissures to another?

A. On this exhibit—wait, you want an observation, don't you?

Q. Yes, sir.

A. I better look at my notes. It depends entirely upon the amount of crushing that there is between. At th-s point along numerous cross fissures which join these two great ore bodies there are workable deposits at least 120 feet from either master fracture.

Q. There are only two master fractures that you refer to in this ground, doctor?

A. The term "master fracture" is one of very indefinite meaning. I mean these two large outlining systems. There is another one we may call it, a small fault which is known as the Creden vein, in this ground and that is a master fracture although at one
1160 end it fades out; hasn't anything like the persistence that these two outlining fractures have.

Q. Doctor, isn't it true from your acquaintance with this camp that you can follow from one vein to another through the whole Butte camp on some sort of fracture?

A. As I explained when I gave my qualifications yesterday, I don't pretend to know the Butte district except from reading about it, in any of the ground——

Q. You have read Sales' report?

A. Yes, I have read his report.

Q. And you have observed the maps that are in that report?
A. Yes.
Q. The whole Butte district represents one great system of veins interlacing, one with another?
A. I think that model—Mr. Searls' map—that shows it.
Q. Wherever one of these cross fractures reaches another fissure, you would say it became the same vein?
A. Why, no, never. There are later veins.
Q. But where they are of the same age you would say it is the same vein?
A. Certainly not.
Q. All right, we will pass that then. Have you your notes of the mill tunnel?
A. Yes.
Q. Would you object to laying them up here where his honor can see them, and we will go along the Mill tunnel? I want
1161 to see what actual observations you have made there.

The Court: If he reads them it will be sufficient, unless you want to examine them with him.

A. As I stated before I followed a vein from this point to this point.
Mr. Gray: What was the course of that vein shown on your notes?
A. It is approximately the same as this one. You could easily take it up there.
Q. That is the one that runs sort of lengthways?
A. Oh, I can get it. It is a little north of west.
Q. And then what have you crossing the tunnel?
A. I have three or four—wait, I can count them—I have three small features shown there.
Q. Northwest fissures.
A. Yes, but I am not certain that they cross the tunnel. This one doesn't cross the tunnel. I am not sure that any of them do.
Q. You show them crossing your tunnel, crossing your working?
A. It is indefinite. I don't think they cross the tunnel, but it is possible they may.
Q. I just want the fact as shown by your notes. They are there shown crossing the tunnel are they not?
A. Crossing the tunnel, yes.
Q. And the course of the first one as you observed it underground?
1162 A. It is a few degrees north of west.
Q. The course of the middle one which crosses the tunnel or the working?
A. It is rather more, as shown here, rather more west.
Q. Did you take any observation there as to its course?
A. I don't think I did; I don't remember.
Q. What is its dip?
A. I have no record of that.
Q. What is its dip?

A. At the place I observed it it was very nearly vertical. I have a mark here of eighty degrees south.

Q. The next one, the third one?

A. Two inches of quartz—the first one is the one I have marked eighty.

Q. The second one?

A. The next one I have nothing except that there is a vein there. I have no observations on it.

Q. Just what your notes show. It is shown on your notes as crossing both sides of the work, going northwesterly?

A. I wouldn't say—yes, I think you might say it does; it is of minor importance. In my notes it does. The line goes there and I suppose the vein may.

Q. Following along the third one?

A. That shows a crossing.

Q. Have you its course and dip?

A. No.

1163 Q. From there on to station 1111 what have you—you went through rather fresh granite, there, didn't you?

A. Yes. I don't remember 1111—well, it is not fresh over here but it is on this side.

Q. That is where this little northwest fissure cuts across?

A. Where the east-west fracture and the northwest fracture are together.

Q. Now, then, professor, from station 1111 to station 1119 you had fresh granite, didn't you?

A. No.

Q. What did you have?

A. There was a vein there as shown on this map and it can be seen some feet up above, where it comes within a few inches of this quartz body.

Q. Is that the vein goes out up through the little working running northerly from station 1119?

Q. The whole Butte district represents one great

A. No, I don't think it goes out there. I don't know.

Q. How have you it shown in your notes?

A. I have it stopped right there.

Q. Going out into these workings?

A. It starts through, yes.

Q. The vein that you followed along there turns north along that work?

A. It goes into that working; I don't know whether it goes clear through.

1164 Q. Goes into it?

A. Yes.

Q. From where that begins to turn northerly until you come over to the blue gouge which is shown upon the exhibit and which you also have upon your notes you are in fresh granite, aren't you?

A. From what point?

Q. From the point a little to the east of the 1119 where this vein which you have been following you say a little ways begins to turn

northerly until you get over to this northwest fissure—first, you have a northwest fissure shown at 1118, haven't you, in your notes?

A. Yes, I have.

Q. Gouge?

A. Yes.

Q. From where you leave this other little fissure going at—a little east of station 1119 to the fissure which follows up into the northerly workings, until you come to this point you are in fresh granite, aren't you?

A. No, indeed; altered granite.

Q. Altered somewhat like this specimen 4 that you have presented to his honor here?

A. I should say perhaps nearly as much; not quite as much altered as that perhaps.

Q. Not quite as much altered?

A. This is beside a fairly strong vein. There is not as much alteration, quite as much as that.

1165 Q. There was not quite as much alteration in the granite which you saw in the mill tunnel as in exhibit 4?

A. No, there may be more, but my recollection is that there may be less, but on the whole the alteration there is probably more than the alteration there.

Q. Between the points that I have last referred to is the granite altered as much as exhibit 4, in your opinion?

A. I can't remember those details.

Q. Approximately the same?

A. I think it is altered more, but I am not sure.

The Court: Altered granite?

A. Yes, it is altered granite.

Mr. Gray: But a minute ago you said that this plaintiff's exhibit 4 was right next to an ore body and therefore perhaps was more altered—I just want to get at it?

A. Right next to a considerable body. Now, you speak of a drift about forty feet long. I can't say how much granite is altered in any part of that drift, but right along this vein that is shown my recollection is that it is considerably altered. I am sure there is much alteration in this——

Q. Up to 1119?

A. In this portion between 1111 and 1119, yes.

Q. How about from 1109 to 1110?

A. There is some alteration too.

Q. Very slight, isn't it?

1166 A. Very slight?

Q. Yes.

A. No, it isn't as intense as this alteration in some other places.

Q. When you come to 1118 there is a northwest fault, isn't there?

A. I don't know.

Q. Take your notes, haven't you a gouge represented there?

A. Yes.

Q. What is the course of that, professor?

A. May I take it from this map or from my notes?

Q. I prefer from your notes.

A. Rudely about northwest.

Q. Now, then, a considerable ore body comes right up against the northwest slip or fault from the west?

A. Yes.

Q. And is cut off there?

A. I am not sure whether it is cut off or not.

Q. How do your notes show it or observations?

A. They show a gouge there. I remember there is a gouge there, plain wall there. It might be cut too; it meets one of these ore bodies that end up against the fracture. I can't tell.

Q. In other words, this caved stope runs right up against that rather plane wall, doesn't it?

A. No, sir, it doesn't. That cave stope is on the surface and this is underground I don't know how far below the surface.

1167 Q. No workings on that level then?

A. Not at that point—oh, yes, there are; there are some workings, but they are not in this part; there are some stopes out there.

Q. Now, then, you proceed on westerly and you come to the place—have you the stations on your notes there—I have it, station-1108 and 1107; they are not marked upon your exhibit 66; this is on plaintiff's exhibit 9—1107 and 1118?

A. What about it?

Q. You find a northwest fault there, do you not?

A. Yes, I am not sure; it is a fault; there is a fissure there.

Q. Well, northwest fissure. What is it filled with?

A. Well, there is gouge along it.

Q. How thick is the gouge?

A. I don't remember, perhaps I have a note of it—I have no note of it. I don't know how thick the gouge is.

Q. There is a distinct displacement of the ore bodies, there, isn't there?

A. I am not sure of that.

Q. Don't you show it?

A. You mean displacement as by a fault or do you mean——

A. Yes, I don't care; just displacement?

A. I would like for you to define "displacement" because it is a general term.

Q. I won't bother about that. But if you will just sketch

1168 what you have at that point from your notes on this sheet?

A. Is that as far east as you want to go (indicating)?

Q. Yes, that is far enough.

(The witness indicates.)

The drawing was admitted in evidence and marked Plaintiff's Exhibit 109.

Q. Exhibit 109 represents what your notes show with reference to the working there from station 1107 to 1108?

A. Approximately. May I connect that; I want to put a little red in there?

Q. All right, do so.

A. I would like to say that that is the way I have it in my notes, but I don't know that that structure runs that way. I am trying to represent what is in my notes.

Q. You said that in your judgment there was no faulting of the granite in the original fissuring found where these great fissures have developed ore bodies?

A. I said I thought there probably was some, a little movement. I can't conceive of wide open spaces being formed by cracks opening out along a rock like that (indicating). I think generally there is some movement, but I don't know.

Q. It is impossible to determine because they were the oldest fissures and in the homogeneous rock?

A. There is nothing with which we can compare them except these aplite dykes and they are so altered we cannot correlate
1169 one with the other on opposite sides.

Q. You find the aplite in various places, do you, as altered instead of displaced?

A. Altered?

Q. Do you find it altered at all?

A. Yes, it is altered a little but very little. That (referring to one of the exhibits) shows veins and some little alteration therein; it is not altered anything like as much as the granite.

Q. Well, you have observed aplite somewhat altered in this ground; have you marked it as vein?

A. Oh, I don't think so; if I did, I made a blunder.

Q. You do not consider the altered aplite a part of the vein?

A. Why, certainly not; it is entirely different.

Q. Even though it has some little scattering mineralization in it?

A. Why, if there is a vein in it of any size, of course I marked the vein. I would not map anything as small as that sample, unless there were a great many of them closely spaced.

Q. Have you found aplite in places so altered as to consider it part of a vein?

A. I don't remember; there may be some such.

Q. Have you got any aplite marked in 1501 cross cut from the Elm Orlu shaft?

A. I have.

Q. Have you got it marked as vein?

A. Not that I know of; I have aplite there. I will just
1170 explain that I used a green pencil to indicate aplite, and crawling over gob I lost it, and after that I used purple for the same thing.

Q. Is there anything that is marked vein that should be marked aplite on that cross cut?

A. Yes, there is aplite and there is vein in it.

Q. I mean the red northeasterly from the figures 85°?

A. Yes.

Q. Do you consider that part of the vein?

A. It is mineralized; I have a note on it here. "It is pyritized granite, very little quartz except at the border." And it shows quartz at the borders and some quartz inside.

Q. Do you consider that a part of the Rainbow vein—a part of the vein?

A. I think it is probably connected with it; I couldn't say about that. It is part of the general period of mineralization I think Now, if you will allow me——

Q. Yes, say anything you want to.

A. As I think I said this morning, granite is much more affected by these ascending solutions which we presume deposited these ores than is aplite, and where a vein crosses aplite it frequently alters it very little compared with the alteration in the granite near by. I think that is because the granite has in its composition those dark minerals which are more easily replaced by those solutions. Therefore, where we have aplite in this granitic area, as a general
1171 rule it is not as much affected as the granite is by these solutions. As far as I see it, I mean; I am speaking only of the territory I have examined; I don't profess to know the relations of the whole district.

Q. Certainly. This cross cut from the 1608 drift of the Black Rock, is all aplite, isn't it?

A. I think I have that on a small map. No, it is not. I have mapped there six veins, and I could have mapped a great many more, because this is a specimen I got from that very place, which illustrates the very point, No. 132. I have a description, "Black Rock 1600 between sections 21 and 28, aplite cut by quartz veins." They are not very large veins, but they are very closely spaced, and the end of the cross cut is caved, but I have shown on my map aplite with some little quartz veins in it.

Q. And it has a little fluorite in it; did you observe that, or a little tourmaline?

A. I would not be surprised if there was a little tourmaline. I did not know there was much fluorite. When we found we could not correlate it with the fissures on the other side, we did not study it with very great care.

Q. You don't consider aplite, the altered aplite with these little stringers of quartz and the other minerals in it—you don't consider that part of the Rainbow lode or vein, or what you may call the Black Rock vein?

A. Aplite is never considered ore, unless it has sulphides
1172 in it, and at this particular place there is very little sulphide.

Q. Yes, but suppose you have 10 or 12 feet of aplite with some quartz stringers through it such as sample 132, do you consider that part of the vein?

A. Part of what vein?

Q. Of this large vein that we have been speaking of here, the Rainbow lode, or what you call the Black Rock vein?

A. Why, you might consider it, and you might not.

Q. I want to know what you consider it?

A. I have mapped it here just as I gave it; I don't know what else to say; I have aplite with some stringers of quartz going through it.

Q. You don't care to be more positive as to whether or not it is vein?

A. It is a feature that parallels this. If I were mining ore I should certainly never consider it vein matter, though it may have some quartz stringers in it.

Q. You would rather consider it country rock?

A. As a matter of fact the aplite itself would be certainly country rock.

Q. Well, changed, as the samples that you have?

A. It is not very much changed; it has been fractured, but it is almost the same as aplite that is far removed from the veins. These veins do not seem to change the aplite.

Q. Let us be more specific. On 1608 cross cut, do you
1173 think that should all be marked red to indicate that that is part of the vein, the one from which this aplite was taken that you have just been talking about?

A. Why, certainly not. It has a few veins, that are about as big as those, running through it, but it is not all vein.

Q. You would not consider it part of this great vein then?

A. Not all of it, certainly not.

Q. Now, take these two little northwest faults in the mill tunnel; proceeding on westerly, where do you find the next fault having a northwesterly direction?

A. I would like to make a statement. You said I had these two northwest faults. I said I am not positive that they art faults, for sometimes we have—I have no note of it I would not be surprised if they contained gouge.

Q. What is the character of the gouge that you found in there?

A. I have not studied it carefully; it is just a slip. It may be a fault; I don't say it is not.

Q. It certainly looks like it?

A. Certainly, and if I had any correlation with any faulted mineralization—I did not see the limit of this; I just drew it there as I found it, and it may be a fault.

Q. And close to the northwest fissure?

A. I don't know; I am not familiar with the northwest
1174 veins over the whole Butte district, to identify a fissure because it has the same course with another fissure far off, because it has a somewhat similar course.

Q. What difference do you find between the one you have just platted on Exhibit 109 and the Deadwood fault; what other distinctions?

A. I don't know just what you mean. One is a very small thing, and the Deadwood fault is a thing that can be followed for hundreds of feet. Difference—I don't know what you mean. One is very small and one is very large.

Q. That is the only distinction?

A. Well, if you will permit me, I will tell you just how much I know about this and how much I know about the Deadwood fault—I mean how little I know about it.

Q. I am simply asking you if there were any observable difference between them, other than their size?

A. Why, the Deadwood fault where I have seen it has a great deal of crushing; great bodies—I remember one wall of ore a gouge as big as—oh, twenty feet, as I remember it, approximately; you could look that far and see much crushing. This is an insignificant thing compared with it, and that is an enormous feature, while this is trivial.

Q. All right; let us take the Deadwood fault. You have it mapped here some place?

A. Yes.

Q. It crosses through the vein?

A. Yes.

1175 Q. Is there any place where you can measure the displacement along the fault of this Rainbow lode?

A. Well, we will take the 1300 of the Black Rock. This area here has been complicated by two crossing faults, the Deadwood vein faults the Black Rock vein and is in turn faulted by a fault which we call the Black Rock fault which is later than the Black Rock vein. Therefore, to get the displacement I must first bring this point back to this, and then I can measure from this point up to this and I can give you approximately what I would consider the probable distance of the displacement there—that is, the offset; I would not say that that is the actual displacement, but it is the offset.

Q. All right.

A. As shown in this working, it is about 40 feet.

Q. That is on the 1300 Black Rock as you have measured it?

A. Yes, sir.

Q. You say the Deadwood vein is faulted?

A. Yes, it is faulted by two parallel fractures of the Black Rock. I wish to state that it is rather more complicated than my simple statement implied, and that there are two little parallel fractures in there, and that the figure 40 was a very rough approximation.

Q. I understand that. Let us go over to Exhibit 18. Did you observe that fault that faults the Deadwood at station 763?

A. No, I don't know much about those workings. I may have seen it. What is that level?

1176 Q. That is the 1000 level.

A. I have evidently overlooked it. You see, I have cut it off my map. There was something coming in there, but I don't remember what it was.

Q. Well, you have it mapped on your own Exhibit 74 here?

A. Yes.

Q. Near station 1020?

A. My maps were cut off, the north part. I haven't paid much attention to the region around the Black Rock Elm Orlu. I hurriedly ran out there, but I haven't a map upon it.

Q. You could not then tell us to which period of fracturing that fault belongs, and the Deadwood belongs?

A. No, I could not. As a matter of fact, I think that those correlations of the genesis by directions should be scrutinized very closely before accepting them, as opposed to structure. I would not look at

a fissure and say what age it is, if it had the general course of another fissure and I had no more data.

Q. Did you see the gouge in that fissure that faulted the Deadwood?

A. I declare I could not say. I have no doubt there may be gouge in it. There is gouge in all fissures.

Q. I wanted to know if you have any recollection of it?

A. I have no recollection or information on the subject,
1177 except a general impression that gouge does fill practically all fissures that I have seen here.

Q. Now, you said something about these gouges in the Black Rock and the gouge in the Jersey Blue and these other gouges being post-mineral, aren't they?

A. Yes.

Q. How do you determine that the gouge in the Jersey Blue was post-mineral?

A. Why, it carried a great deal of crushed up mineralization, and therefore was not after this mineralization, because it contained that crushed ore.

Q. You do not believe in the theory that the faulting and the mineralization occurred at approximately the same time, or intermittently?

A. I have not looked into that theory, and I have made so few observations in the Butte district outside of the area in discussion——

Q. It sounds reasonable, doesn't it, Professor?

A. Very reasonable men have said it. I have no doubt it is probably a possibility; I don't know——

Q. It is not your idea that all the faulting occurs and then all of the mineralization subsequently?

A. Why, no; there are many faults after both periods of mineralization, and subsequently there may be infiltration and solutions may alter these minerals again, as I tried to explain this morning, where we get secondary mineralization 1700 feet deep in one of these mines—probably forming today, but they are later than this
first episode. The first episode is one probably connected
1178 with vulcanism, and the second episode is connected with the rotting away and oxidation and enrichment. The second episode, I think, is of subordinate importance, because I have not found very much of these secondary minerals. I have found evidence of some secondary alteration as deep as the 1700, but I have not found evidence of a very great deal of it. There may be more than I found evidence of.

Q. What secondary mineralization did you look for?

A. Well, I confess that I have looked for secondary zinc mineral in these mines, and wondered why they are not formed. I don't know of any mine in the country where there is so much primary zinc and no secondary. There is goslorite, zinc sulphide near the surface, and extending in the cracks down to a considerable depth and there is this wurtzite down as deep as the 1700 level.

Q. Is it your opinion that the upper four or five hundred feet o

the Rainbow lode as it has been worked here in the upper workings was originally zinc ore?

A. I could not say as to that. I have puzzled a great deal over that. I think it had zinc in it, but I don't know how much it has, and my opinion would not be worth anything, because I have not come to any definite conclusion.

Q. Where you observed it in these upper workings have you found solid zinc ores or ore bodies?

A. There are so little workings there—there are so few workings that one cannot be certain how deep it extends, but I have
1179 seen it right along under the surface, altered.

Q. The Dewey tunnel cuts both the Jersey Blue and the Rainbow, doesn't it?

A. Will you please point out the tunnel; I am not used to this tunnel?

Q. Here?

A. Oh, yes, yes; it cuts both the Jersey Blue and the Rainbow as you call it.

Q. Do you find the same character of mineralization in both those veins at that level?

A. Why, I have not made a survey of the mineral. That is, I have been in there, but I don't think I have many notes of that particular point.

Q. You heard Mr. Finch testify about this solid commercial zinc ore in the Black Rock tunnel, didn't you?

A. Yes.

Q. Did you see it there?

A. Yes.

Q. Have you ever seen it anywhere else near the surface in what we term the Rainbow lode?

A. Including the Niagara workings?

Q. Yes, within a hundred feet of the surface.

A. Yes, they have been mining it down there for 15 years within 100 feet of the surface and within 30 feet of the surface.

Q. Zinc ore?

A. No, the sulphide ore.

Q. Silver ore.

1180 A. Yes.

Q. Are they like the zinc ore that you have referred to in the Black Rock tunnel, the ores that have been mined out of these stopes by the leasors?

A. I haven't seen very much of that ore, but I have seen some pieces which I obtained there. The ore has been taken away, but a man showed me some pieces of ore that came from the stopes, and that had much more quartz in it than the Rainbow lode elsewhere.

Q. That is, than you found in the Jersey Blue?

A. Either in the Jersey Blue or in the Elm Orlu.

Q. That is in the lower workings?

A. Yes.

Q. Did you arrive at any conclusion from that difference?

A. Conclusion as to what?

Q. As to whether or not there was any difference in age between the Jersey Blue and the Rainbow as claimed to exist by us?

A. Well, to reach such a conclusion, how could that possibly be taken as evidence. It is all the Rainbow. I don't know just what you mean?

Q. Do you find any solid zinc ore bodies on it, in what we call the Rainbow lode near the surface?

A. In the Dewey I saw a little chalcopyrite.

Q. Where?

A. I can give it exactly.

Q. In the *Jersey Blue* or in the Rainbow?

A. In the Rainbow lode, in the strand which you designate

1181 as the *Jersey Blue*, and we call the Black Rock.

Q. Isn't it true that in this southerly strand that we call the Rainbow, that the oxidation has been carried further and is more evident than in what we call the *Jersey Blue*?

A. That is a very difficult thing to answer, because oxidation is such an erratic feature. I have seen veins—many I speak of that?

Q. I would like to have you answer as to this one, then you can tell what you know about other veins.

A. I cannot say, but I will say that I find at this point in the *Jersey Blue*, and I do not recall having found any—I may have—but referring to my sheet I cannot recall having seen sulphide anywhere else except in the *Jersey Blue*. I think there is some sulphide ground out here, but I haven't any note of that. I know there is in the Black Rock fault, but this is very small; it is not so conspicuous as over here.

Q. In the Black Rock fault some place?

A. Yes.

Q. But they are not as conspicuous as in the *Jersey Blue*?

A. Yes; that is a pretty good body, perhaps a foot wide.

Q. In the Dewey tunnel and the Black Rock tunnel?

A. Yes. If you wished me to I will answer the question that you asked me to a minute ago about the depth of oxidation. You asked me if the depth of oxidation was greater in one vein than it

1182 the other. At this point I should say that that is as high as any sulphide ore that I know of, but that is a very erratic thing, and I would not think of saying, because I found it there, that this vein is less deeply oxidized. At Philipsburg, Montana, there is a great lode, nearly a mile long — a half a mile deep. There are great bodies of secondary ore that extend a thousand feet deep more or less in different places, but on that vein in a trench this summer I found cyprite and pyrite, sulphide minerals at the very surface. By the fracturing which *following* the deposition of the ore portions of the ore remain comparatively intact. The fracturing is not equal; in one place the ore is thoroughly fractured, and in another place is fractured only a little, and in another place perhaps not at all, and if downward oxidizing waters go through such a body, they will of course oxidize and alter the ore more completely at one place than they do at another. I have found at many places unaltered sul-

phides approximately at the surface in ore bodies which have been greatly altered in depths, at other places along the strike.

Q. The Jersey Blue, do you find as much fracturing as you find in the Rainbow?

A. Now, the Rainbow has several fractures——

Q. I mean what we have delineated as the Rainbow?

A. Well, I wish to say that this ore body——

Q. Take it on that level of the Dewey tunnel. Do you find as much fracturing of this ore in the Jersey Blue as you do in the Rainbow?

1183 A. I can only answer that in general terms. I know when I was studying the cross cut there and below, whenever I came to a great mass of gouge it generally crushed more or less of the Jersey Blue vein; the workings would be down.

Q. You mean caved?

A. Caved, at some places, and that is frequently the case, so that I think it is post-mineral fracturing, this fracture, the same as the other.

Q. Did you observe as much caving in the Rainbow near the surface?

A. Yes; I think that all this big fault that goes through there, wherever we find it, it is very badly caved.

Q. You did not go down to the 100 level of the Elm Orlu from the discovery tunnel?

A. I did not go into some place there where there was bad air.

Q. Bad air, I don't know where that is?

A. It is this place; but the other levels I have been through.

Q. This 100 foot level, were you in there?

A. There are two levels platted on this map, and I am not sure which one you mean.

Q. This is the 100 foot level, this one here.

A. Yes, I was in there; I was in part of this.

Q. It was a very old working, wasn't it?

A. I don't know; I wasn't here when it was run; I could not say.

Q. The walls were all standing?

1184 A. Well, I will look at my notes; I don't remember those details.

Q. That is a place where you found it caved—find out whether that was caved?

——.

Q. The sketch 1 on exhibit 107 represents the conditions as you observed at just where?

A. In the drift marked 450.

Q. What was opposite the red on the north side of the blue?

A. At what point?

Q. Opposite the red on the other side of the blue fault or gouge?

A. At the point you mention there the gouge has a wall as I remember it, or practically so; there is a little granite in there.

Q. On the other side of the wall?

A. Yes.

Q. Will you please mark the granite in yellow?

A. I would like to say that is crushed granite.

Q. Crushed granite?

A. Yes.

Q. All along there, or have you marked it as well as you have observed it?

A. There is crushing all along this Block Rock fissure of the granite—some crushing I think.

Q. By the Black Rock fissure you mean that fault AB?

A. Yes, and where it turned around there is crushing, crushing of granite all along there.

1185 Q. Mark where you find the crushed granite along the term, where you have put the yellow line?

A. In a general way—I can't say exactly,—the point I observed the crushed granite—there is crushed granite in there.

Q. You said it was around the curve?

A. Yes, there is crushed granite somewhere in that area undoubtedly; I think a great deal of it is crushed. Long fault of granite is nearly always crushed somewhat.

Q. Now, then, in the right hand of the working didn't you find much gouge in a northeasterly direction?

A. Going northeasterly there is this feature.

Q. AB?

A. You mean going northeasterly?

Q. Yes, in this direction (indicating)?

A. May I get that exactly?

Q. Don't you find the Black Rock fault coursing on up to the northeast?

A. I don't find what I identify as the Black Rock fault. I think this is a strand of the Black Rock fault and it is marked by a gouge that is very conspicuous, where we have this blue line, and it contains crushed, dark minerals so that you can easily follow it, as I remember it; almost like a strong pencil line—broader of course.

Q. And you have exhibited on here everything that you have seen or that was observed in that working, professor?

1186 A. That is a broad question. I think, certainly, if there is any details I have left out I would be glad to put them on. That is a drawing of this map. If there are any details I would be very glad to furnish it. I have a note there "gouge six inches wide" back, turns and follows this way. There is crushed granite here as I said.

Q. Following this vein you say it follows and becomes the westerly wall of what you have marked as the red vein on exhibit 107?

A. Yes, that is exactly what I mean.

Q. I will put it in red, a blue dotted line so there be no doubt about it—you didn't observe the blue dotted line representing in the Black Rock fault in that working going on northeasterly?

A. I couldn't observe it because it was not exposed; the working did not extend in that direction. There was, as I have said, a crushing here.

Q. With reference to this drawing one other thing—drawing No. 3 on exhibit 107—that was taken from what?

A. Taken from exactly that point.

Q. 751?

A. Yes.

Q. Will you point out to the court where the northerly and southerly walls of that vein are as exhibited upon your sketch, which—what you call the walls of the vein, using a green crayon to represent that?

A. Now, this wall as I said is slightly altered granite as
1187 exhibited in—this is the piece—I can't read the number—E-4—that is somewhat altered, but the vein proper is certainly shown as correctly there, and this shows exactly what is there.

Q. That is, it is a correct delineation in red?

A. Yes.

Q. The yellow is altered granite?

A. Somewhat altered but not as much—but not much fractured, except where the fractures are shown—it is not crushed; it is not gouge in any sense or much fractured.

Q. Professor, can't you distinguish between what you call altered granite in the mill tunnel and this altered granite in the place of working 702?

A. They are both altered granite; they are both altered by vein processes, vein forming processes.

Q. Why do you call it "vein" in the mill tunnel and not call it "vein" in this working?

A. This is a quartz vein. As I said, there is some alteration, just how much alteration there is I do not know. I do not deny that there is some mineralization extending out from this vein, as there is from every vein.

Q. I don't think you understood my question—if you will just read it?

(Question read as follows: "Why do you call it 'vein' in the mill tunnel and not call it 'vein' in this working?")

A. In the Mill tunnel the alteration of this zone I should say is rather more than the alteration here. Besides, there are
1188 many small fractures here, many small fractures and I don't think there are any of any consequence in this. This may show some small fractures here (referring to exhibit 4). I don't see any.

Q. I was endeavoring to get the criterion by which you determined whether this other granite was a part of the vein or not?

A. Well, sir, that is a matter of judgment and there are no two men who would give it exactly the same definition. We accept what is quartz and if it is very much altered—the granite like this—we would call it vein matter or altered granite, particularly if it carries sulphide by replacement. But I think any two men would have shades of difference of meaning as to just what they would call "vein."

Q. Now, this altered granite at station from 1109 to 1110, did that have altered sulphide in it—strike out the word "altered"?

A. I didn't observe any "altered sulphide."

Q. Did you observe any sulphide?

A. I don't know. I am pretty sure I have a note on it. I will refer to my map. I have no notes to that effect.

Q. Well, you have given all the reasons, have you, professor, why you have eliminated the altered granite from the vein in the working at point 751 and have included it in the mill tunnel?

A. I think possibly we are laboring under a slight misapprehension as to why this is included. I showed—it was not
1189 intended to show there was no alteration. I stated there was some alteration, but I intended to show the fracturing.

Q. I understand that. Now, if you will just read the professor my question.

(Question read as follows: "Well, you have given all the reasons, have you, professor, why you have eliminated the altered granite from the vein in the working at point 751 and have included it in the mill tunnel?")

A. I would like to say that here there are several closely spaced, parallel fractures.

Q. Those are the northwest fractures that you have crossing the working, aren't they?

A. No—some of them cross but some of them parallel the working. And I think by reason of the fact that there are a number of quartz veins in a zone, one would certainly be more disposed to call it "vein matter" than they would in an area where there was only one.

Q. Where there is only one you wouldn't call it "altered granite," but where there are several veins you would?

A. In the level, in altered granite at this point, but not so here, as at other points—may I explain a minute.

Q. Yes, if you wish to?

A. The solutions which deposit these ores are presumed to make out from the center fractures, from their sides; they go out in a very erratic way, in some places they extend a foot; some places more and some places less. But, if there are several closely spaced
1190 parallel fractures that extend out, perhaps making a broader zone, a little from each one, and there will be a wider zone of alteration than there would be where there is merely one vein.

Q. All right. Now, give me the 400, won't you, please. You have spoken, professor, of a vein given there and of the granite there, this great Jersey Blue fissure, which you call the Black Rock vein. Now, there are some crosscuts on the 400 level, aren't there?

A. 450, do you mean?

Q. On the 400?

A. Yes.

Q. Have you been through crosscuts 402 and 412?

A. 402—as I remember has been concealed or caved down for a long time.

Q. 412, 406, and 414; have you been through those crosscuts?

A. I am sure I have been through most of them. I think I have been through all that are available.

Q. Now, if you will just take your number 412 and describe the character and extent of granite alteration on both sides of this Jersey Blue vein?

A. Granite alteration on 412, granite alteration I have not——

Q. That is all you have?

A. I have "granite alteration" here. It is somewhat altered. Now, it isn't anything like as much altered as in the center
1191 of these great bodies that form between the two veins, of which this is a representation. As I understand it is not as much altered as that.

Q. Is it altered to the extent that you consider it vein?

A. Why, no—somewhat altered.

Q. Is it altered as much as it is up in the mill tunnel, where you are calling that vein, across the end line?

A. Indeed, I cannot say.

Q. All right.

A. I don't remember all these.

Q. In this 412 you come to rather a definite wall of the Jersey Blue where there is gouge on the south wall, don't you?

A. Yes; yes, I have that noted.

Q. And you also have a definite gouge on the north wall, haven't you?

A. I don't think it is so definite—oh, the north wall is the more definite one as I remember it.

Q. But you also have a definite one marked up in your notes on the south side, haven't you?

A. Yes.

Q. Now, let's come to the crosscut 406, how about the alteration of the granite there? You have that gouge in the south wall there in your notes; you have the blue gouge on the south wall there, haven't you?

A. I haven't it shown on this map; there is a little shown there; there is a little bit of it; there is a little shown on my map as I recall it.

1192 Q. On the south side of working 422; is that correct?

A. There is considerable fracturing there. In fact the vein is faulted about—well, you can see on this map the fracture crossing the vein a little there—a fracture that crosses the vein about there (indicating).

Q. The Jersey Blue?

A. Yes.

Q. And it faults it?

A. Yes, it faults it about two or three inches. I can't say the amount; it is a few inches there. I happened to be there when that was driven—a little fracture across it.

Q. You have got a gouge along the working 422—drift 422?

A. I don't know whether it is or not—must be so if it is marked there.

Q. You also have it on the north side?

A. I have it here too; it is marked on both sides. I have no doubt it exists on both sides.

Q. Let's get back to the question I first asked you. How about the altered granite in 406, on the south side of that vein? Have you that noted at all?

A. I don't believe I have. I have some notes here—I have no notes on that place.

Q. How about 414? What is the extent of the alteration of the granite—have you got the gouge wall there for the Jersey Blue on 414; what is on your map; what is this one; got gouge there,
1193 have you, on both walls?

A. I have that drawn in on both walls because I saw that on both walls here, but as a matter of fact at that place of observation there was running gouge, ore, crushed up material along that Black Rock fault, and I couldn't be positive; I have in my notes two parallel lines which I think probably represent the conditions, but there was much crushed material there in the bottom of the drift.

Q. Found it a little different from the gouges that you found along on this Jersey Blue, didn't you?

A. Different, no; same material.

Q. It was running over here.

A. One is running and one was not but the same kind of material. One had come down into the drift and one had stayed up. It was heavier, if that is what you mean; it was more crushed here I think because it was running so.

Q. But you put it in your notes on both sides of the Jersey Blue vein, assuming that it was there just the same as it is in these other ones?

A. Yes.

Q. And what notes did you make about this altered granite on each side of it there; any?

A. Much fracturing, ground-up granite, rhodochrosite and quartz.

Q. On which side?

1194 A. I can't say which side; it is the stuff that came down into the drift as I remember it.

Q. What was in this working disclosed here, professor?

A. That is from the raise, from the—section 23, I think——

Q. Exhibit 68, it crosses the Jersey Blue vein anyway, doesn't it; have you got that in your notes?

A. I have the workings, but I haven't been in there.

Q. You haven't been in there?

A. I should say I have not been in the Jersey Blue from the Jersey Blue raise except above the 400 level. I have been told it was bad ground and consequently did not go in.

Q. You have been in crosscut 809, have you?

A. Yes.

Q. Identified the Jersey Blue there?

A. Yes.

Q. Have you your notes?

A. Here are my notes on that "rhodochrosite, zinc and quartz" from this point.

Q. Well, where is the south wall of the Jersey Blue there as you found it?

A. Well, I think you could very properly call this wall the wall. It is that zone of fracture, and you could probably call that the south wall. It is the last quartz seam that I have in my notes.

Q. That is at station 83?

A. Station 83.

1195 Q. Is that continuous vein matter from there over to the gouge?

A. There is some granite in there.

Q. Where we had passed that granite to the southern wall of the strand which we call the Jersey Blue?

A. I have a note that it contains zinc.

Q. Is there a gouge in the south wall of that?

A. Four feet of ore, quartz and zinc—no, no gouge shown on the map.

Q. You have two lines of gouge, shown up there, haven't you, professor?

A. I have only one blue line.

Q. What is the course of that gouge there at station 178?

A. The course?

Q. Yes.

A. Parallel to the vein.

Q. Did you take an observation?

A. Of its dip, but not its strike. Its strike you see is shown on the workings.

Q. What is the strike of the Jersey Blue vein as disclosed in the 808 working?

A. From 96 station to 178 station north about 80 west, but I may say if we would take the regular course it would be—this makes it 11. The other observation was north 80 west; this one is north 79 west.

Q. Now, as the geologist who has put the geology upon the map has portrayed it, give me the course of it, as he prepared it, from the working 817 to station 178?

1196 A. I make that run north 75 west.

Q. What is the course which you get for the Rainbow lode from working 817 east to the west line of the Elm Orlu?

A. It is faulted there and irregular, but the general direction—the average course of the lode?

Q. Yes, the average course of the lode—well, if you can't do it conveniently, give me the course from 817 to 811?

A. North sixty-three east.

Q. Which side of the Black Rock fault represents the moving or moved side?

A. I don't know. That is a very difficult question to answer. Mr. Irving went into that very fully the first day, how difficult it is to correlate movements on bodies that fault. That came out in

connection with the discussion of the supposed fault segments of the Jersey Blue vein as designated by the plaintiff.

Q. Which way does the Black Rock fault dip?

A. I can give you pretty accurate information on that. I have it portrayed in every level.

Q. Just generally?

A. It is nearly vertical; that is it can be included within these two points.

Q. 105 feet apart?

A. 105 feet apart, yes. I can bring it still further apart if you will show me those two tracings on which this work was based. On the model here the waving surface of the Black Rock fault
1197 would occupy from level to level, practically all of this space. It is about 100 feet and measured on the different levels from its position on other levels. If we produce the Black Rock on all of these levels the walls would come within these two glass planes, but it is very irregular though nearly vertical.

Q. Where is this Black Rock fault on the surface with reference to the Black Rock shaft?

A. I can't say right at the surface because the country is all covered up there with workings and houses; I can't say. I can only say where it is projected from the levels not far below.

Q. All right. That is from the Black Rock tunnel levels or just below?

A. Daylight tunnel.

Q. All right. Where is it with reference to the shaft projected upwards to the surface?

A. There are several strands of the Black Rock fault here. Which one do you mean?

Q. Take it north, directly north of the shaft?

A. Coming into the Daylight tunnel, the first conspicuous gouge is about fifty feet on one side and about sixty—fifty feet on the east side and about fifty-five feet on the west side of this Daylight tunnel. Its portal is a rather indefinite thing; I wouldn't like to locate it exactly.

Q. Locate it as your geologists who have made this map of the works have shown it or upon the surface of exhibit 64 north of the shaft, how far?

1198 A. That isn't the strand I am talking about; it is this one—I think the main strand.

Q. Give the main strand then?

A. This, I think, is possibly the main strand.

Q. That is the Jersey Blue?

A. Yes. Due north of the shaft it would be forty feet.

Q. Now, then, where does that pass through the shaft, on what level?

A. I don't know—that is shown at this point; it is not on the level. I wasn't there when the shaft was sunk, and I don't know the exact point any more accurately than that.

Q. Between the five and the seven?

A. Between the five and the seven.

Q You know on the seven that it is south of the shaft do you?
A. Well, there are three strands there as I say, one north, two south, as shown on the map.
Q. Do they all pass through at the 700?
A. No, the one on the north is shown there.
Q. Tell us where it passes through that, professor?
A. Where it passes through what?
Q. Where it passes through the shaft?
A. Why, I think it would pass through down here.
Q. That is below the 700?
A. Yes. I will draw a line where I think it would pass through the shaft. That is purely hypothetical because there are no observations on there.
1199 Q. How far south of the shaft is the Black Rock fault on the 1000?
A. How far on the 1000 south of the shaft is the Black Rock fault?
Q. Yes.
A. South of the shaft there are several strands delineated as the Black Rock fault.
Q. Well, the principal one?
A. I don't know which is the principal one.
Q. Well, the one nearest to the shaft?
A. Here is a little fracture, but I would not call that the main strand. It measures here from the shaft 64 feet.
Q. That is, it is dipping southerly, is it?
A. Yes, sir.
Q. Give me the Black Rock 700 please. What vein do you call this in the Black Rock 702?
A. I would not call it any vein; it was just a little stringer of the Rainbow lode, or the Black Rock vein or the Black Rock Elm Orlu vein, which ever you call it, but I could not identify it with any. I don't know where it joins it, if it does; I don't know that it joins at all, but I have an impression that it probably came off from that somewhere, I don't know where.
Q. You think that that gouge there, that fault, is part of the Black Rock fault?
A. That is a strand of the Black Rock fault; there is a strand here, and a strand here, and one of those, I could not say
1200 which, is the main one. This is a pretty definite one.
Q. Now, if you will take the 800 Elm Orlu. You can trace the Jersey Blue vein along this drift 804 and also 808, can you not?
A. Yes.
Q. To what point?
A. Let me look at my notes. It can be traced practically continuously—I have traced it—it exists continuously I have no doubt, but I did not actually have the lagging taken out and follow every foot of it, but I haven't any doubt whatever that it extends eastward from a point in 809 cross cut to——
Q. What station here on the map?

A. Well, that is your map; I won't say that it exists there till I look at my own and verify it.

Q. All right, look at it. Look at your own notes and verify it?

A. That is just it exactly. It is broken up there very much by subordinate fractures of the Black Rock. Extending along its strike one finds many fragments of ore, but not a very definite thing.

Q. You can trace it along till you get to this principal northeast-southwest strand of the Black Rock fault, can't you?

A. I would not say that. There are subordinate strands here, along which there is much ground up vein matter of the Jersey Blue vein, where it has been ground up by the Black Rock fault, and there is so much of that that you might call it vein matter;

1201 it is certainly disturbed vein matter; very much disturbed.

Q. You find it running along the drift here to station 104, don't you, something that you know is vein?

A. Where is 104 on our map?

Q. Well, those stations are not numbered on your map and I don't know why they are not.

A. No, I haven't any gouge there or broken up fragment.

Q. From 97 to 104 give me your notes; read them off right along this 808 to the east of 821 and say whether or not that is a Jersey Blue vein?

A. "Much crushed granite." Then a specimen taken from a little piece of quartz, rhodochrosite. "Replaced granite veins." "Rp pl." I don't know what that means.

Q. I suppose that is replaced.

A. Oh, yes. "Replaced granite veins all parallel to the fault." These little particles and bodies of quartz were parallel to the fault. I noted that part of it.

Q. That is just east of working No. 821?

A. Yes. This defendant's map shows that better in detail. There are half a dozen there, parallel to the fault.

Q. Yes, I understand; the fault in the drift that you are going along, is that what you mean?

A. Yes.

Q. How far along did you find this vein matter parallel to the principal northeast-southwest strand of the Black Rock fault;

1202 just use your own notes, please?

A. Well, I don't know which I would call the principal strand. I see I have mapped that as a fault, and that and that and that, and I can't say which is the principal one.

Q. Let us get along with the reading of your notes along this drift from crosscut 821 on easterly?

A. I cannot give the same station.

Q. Well, they are not on there; they did not put the stations on for some reason.

A. Well, I can tell from my map. "Rhodochrosite replacing granite." "Fluorite replacing granite."

Q. Now, proceed easterly along this 808?

A. "Much crushed granite." And then at one point there approximately on section line No. 27 on that map——

Q. That would be just beyond station 99 on Exhibit 13?

A. You have on so many co-ordinates that it makes it hard to find.

Q. The first station east of cross cut 821?

A. No. I don't believe that is the correct way to designate that.

Q. All right; here it is, right here.

A. It is on this section line 27. East of section 26, 90 feet, I have this note, "Good vein matter, five feet." There is a block of vein, as I remember it, dragged in along there.

1203 Q. How far east along the drift is that from the station there at the mouth of this north cross cut; just measure it?

A. I think it is about 120 feet.

Q. It is right here at station 100 on Exhibit 13, is that correct?

A. I can give you exactly the reading. Station 100 of the Elm Orlu map, I have a note there, "Much crushed quartz."

Q. Well, you have followed continuously through that working the north wall of the Jersey Blue vein, haven't you, to that point?

A. Now, as I remember that working, it is very wet and badly caved, and I don't think you could follow any feature continuously, because it is about to come together. I know I was glad when I got out of it.

Q. Now, professor, upon this Black Rock fault, south-dipping, moving the segments on the north side and south side along as you moved the segments of the Deadwood vein along this morning on one of the lower levels, indicate where the Jersey Blue vein would be on the south side of the Black Rock fault, if, as a matter of fact, it is, as we claim, subsequent to the mineralization in the Rainbow and prior to the Black Rock fault; where would you find the other segment of it on the south side of the Black Rock fault?

A. As was fully treated by Professor Irving——

1204 Q. Now, I beg pardon; just as you did with the Deadwood this morning, along the fault?

A. Well, as I said when discussing the Deadwood there, it is an indefinite thing; you can't tell.

Q. With the same indefiniteness, then, indicate to the court where this Jersey Blue would be on the south side of the Rainbow, if it belonged to the same age as the Deadwood fault?

A. That is a question that I cannot answer. It is obviously one that no one can answer with any definiteness, because there are four strands of the fault there, and they all faulted in place.

Q. The movement of the four strands of the Black Rock fault was all in the same direction, wasn't it?

A. I don't know; I doubt that very much. Sometimes I think that one of those blocks in there was relatively stable.

Q. If you moved on the south side of that Black Rock fault 40 feet along it, as you did with the Deadwood this morning, you would find the Jersey Blue easterly extension in the workings No. 810, just as shown on plaintiff's Exhibit 13, wouldn't you?

A. What is that?

Q. Applying the same method of determining the throw along the Black Rock fault, and applying it to the Jersey Blue, if the Jersey Blue existed there as the Deadwood did, and was of

1205 the same age, where would you find the southeasterly extension of it, south of the Black Rock fault?

A. Why, I think there is no Jersey Blue indicated on your map at this point.

Q. Point 100?

A. We will suppose for a moment that these are faulted segments of the same vein.

Q. Yes.

A. I would have to know where those other faulted segments in between were before I could tell where the vein was faulted; it might have been much more than shown, and it might have been less; I don't know.

Q. You were able to trace the Deadwood vein on the other side of the fault?

A. I told you it was a very indefinite thing and that I did the best I could.

Q. I asked you with the Jersey Blue vein to do the same thing.

A. I certainly would not correlate anything like this, when it does not go through there. I know this does not go there. I explained that, and I certainly would not correlate that fault on the north dip, because I know the Jersey Blue does not go through, and I know that this vein is not shown there; it is nothing but crushed material. A correlation there would be impossible.

Q. Yes, but assuming that it does, where would it be on the south side of the Black Rock fault on that level, using the same
1206 method which you used this morning in correlating the Deadwood fault on the north and south sides?

A. If I had lost something there and wanted to find it over here, where would I go?

Q. Yes, assuming that it was the same.

A. Well, I would go parallel with the fault for any feature that I though- might be faulted a long distance, but I would not expect to find it here or there; just as I did the Deadwood fault; that is preposterous. As was shown already very fully by Dr. Irving—you don't get those displacements just the same along the fault in different places.

Q. That is probably true.

A. They are very different.

Q. You agree entirely with Professor Irving in his description of these faulting movements of the veins which meet the faults at an acute angle?

A. Yes, but I don't agree with Dr. Irving's interpretation of the features that are faulted.

The Court: There is a great disagreement among the doctors apparently.

Q. Won't you tell us why it is that you could bring the Deadwood fault along the Black Rock fault this morning and correlate the segments of it on the north and south side- of Black Rock fault, and why you cannot do it with the Jersey Blue?

A. The Deadwood fault was located on both sides. I did not correlate it; I showed where it was.

Q. Didn't you indicate about how it had moved?

1207 A. Finding it on two sides of the fissure, I assumed that some part of it had moved, so that its trace would be at the other place, but first the Deadwood was located, and then it was shown how much the displacement was. But here we have not located on one side of the fault anything which I believe is the same feature that we had on the other side.

Q. I know, but using the same movement along the Black Rock fault which you have ascertained to exist at the Deadwood, where would this south segment of the Jersey Blue be?

A. It certainly would not be where it is shown there.

Q. What direction would it be then?

A. May I explain, because that statement sounds a little bare, and I want to explain.

Q. All right.

A. Because the Deadwood is known to straighten up, and it has a curving dip, much more curving than this feature which has been shown on one side to be very much straighter. It is pretty curving, but the Deadwood straightens up.

Q. Well, that is a good deal like the Deadwood?

A. Why, no; I never saw anything curved as much as that anywhere in any vein or fault.

Q. Is that so?

A. Never.

Q. Why can't you do what I ask for then?

1208 A. I was going to indicate that the Deadwood fault comes up and curves somewhat like that, and in the bottom of the mine it dips northeast from 55 to 60 degrees, and I think its plane is changed when it comes to the upper level, so it would be preposterous to assume that the dip of any feature along this fault could be shown by the displacement of the Deadwood.

Q. In which direction on the south side would you look for this segment of the Jersey Blue?

A. I would not look for it at all, because, as has already been stated this morning, it has been shown to merge with this Elm Orlu and does not cross it.

Q. Yes, but I asked you to assume in answering that question that our theory is correct, and that it did fault the Rainbow lode. Then having it on the north side of the Black Rock fault, where would you expect to find it on the south side?

A. I would start a drift and go parallel to the fault, and I would not expect to find it at any one place on the fault; I would expect to find it through a region perhaps of 200 feet on either side, because I don't know how much the throw of the Black Rock fault is, but it has been stated by Dr. Irving that it is probably less than 200 feet. If it had faulted something I would expect to find it somewhere opposite to this point, 200 feet one way or the other. I don't know which way it would go.

Q. But *if* might be in 810?

A. It might be anywhere along a distance of 400 feet either way.

1209 Q. Now, you said something about the Deadwood fault dipping below in one direction and as it approached the surface dipping in another?

A. I did not say it changed the direction of its dip; I said it changed its dip.

Q. That is one of the typical features of the northeast veins, is it, to change its dip, isn't it?

A. I haven't seen any of the northeast veins except the Two Bend fault vein, and do not feel qualified to answer your question.

Q. You indicated to the court that the line on Exhibit 35 when the green shows first against the pink and then against the blue, indicated the line of the dip of the Jersey Blue?

A. Only approximately. This is a stereogram. You could not say that exactly, and besides I did not say this was the Jersey Blue. This part of the model is a feature which crosses the Jersey Blue, and the Jersey Blue goes out in that direction.

Q. Well, the line of dip which you have shown upon your plates 1 and 2 are upon vertical sections?

A. Yes.

Q. The line which I have indicated on Professor Irving's Exhibit No. 35 is the line of the Jersey Blue as it comes up against the irregular surface of the Rainbow?

A. Yes. They are not precisely the same thing, but show the same general features. If you wish that plotted, we have it on
12730 the map exactly. A stereogram never shows it accurately.

Redirect examination.

By Mr. Ellis:

Q. Doctor, how thick was this slip in this mill tunnel that counsel asked you to draw a representation of on Exhibit 108, I think it was; I understood you to say that it was just a knife blade seam?

A. I don't think I did say it was a knife blade seam. I can give you the width of it roughly.

Q. Refer to your notes.

A. I have no notes of that. I remember it as being loose material three about an inch thick. I cannot remember it any more accurately than that.

Q. Did you examine the character of the material shown on plaintiff's surface map; did you observe the surface of it crossing their so-called Rainbow lode or Ute-Ontario-Black Rock lode across the southerly side line of the Black Rock claim?

A. You mean in that trench approximately parallel to the side lines?

Q. Yes, trench E, between station 105 and 107?

A. Yes, I have some notes on that.

Q. How far to the easterly had that trench E been driven at the time you took your notes?

A. It is marked tunnel here—from the east end of that trench eastward a distance of 50 feet there is granite that is very little affected by the oxidation, though it is somewhat oxidized. It is
12731 I believe, not affected by the vein forming processes; certainly not except in the smallest degree. It has a few irregular almost paper-thin seams of quartz in it, and the granite shows dark

mine have been very little affected by the vein-forming processes, if at all. I do not hesitate to state that that in my opinion is not vein matter. But from that point westward about 16 feet there is granite which is somewhat altered; I don't know how to class it, as to whether to call it vein matter or not. It has a few little quartz seams in it, and it may be considered vein matter, but west of that point to the end of the tunnel there is a great mass of quartz and some alterations, and so I would consider it undoubtedly vein. There is about 16 feet about which I feel uncertain.

Q. Now, doctor, taking a point easterly of where you say there is a mass of quartz, how did the occurrence there compare with the occurrence of the mineralization of the mill tunnel at the easterly end of the Black Rock claim?

A. The oxidation is more here.

Q. I am speaking now of easterly of where you find the quartz in that tunnel, which you say is unmistakable vein; from there on to the east on the tunnel, how does that occurrence compare with what you have at the mill tunnel in the vicinity of the east end line of the Black Rock?

A. I should like to preface my remarks with the statement
1212 that the oxidation in this tunnel is very much greater than in the mill tunnel, and I cannot compare them at all because in the mill tunnel the oxidation processes have not gone on so far, and in the tunnel the oxidation processes have obscured the older processes of vein formation or alteration, and I don't think that one is justified in making an answer that means a comparison of two things that have suffered different processes in such different degrees.

Q. Doctor, is this model in which the glass plates have been placed made to scale?

A. Why, yes.

Q. What is the scale of that model?

A. The same as the maps; 80 feet to the inch.

Recross-examination.

By Mr. Gray:

Q. I was just noticing, doctor, this vein that you portrayed on Section F to west of angrolar, isn't it?

A. Yes.

Q. As compared to the curved character of the other one?

A. It must be curved, because from point to point it changes its dip. It is really a feature which I think in the main actually exists. It is a hypothetical feature which must be drawn through those points because it is only in those points where hypotheses have been found to plane it.

(Witness excused.)

1213 *Testimony of Rollin D. Salisbury for Defendant.*

ROLLIN D. SALISBURY, called as a witness on behalf of defendant, after being duly sworn, testified as follows:

Direct examination.

By Mr. Dickson:

Q. State your full name, please?
A. Rollin D. Salisbury.
Q. Your age and residence?
A. 57 years; Chicago.
Q. What is your profession?
A. Geologist.
Q. Where did you study your profession?
A. My college course was taken at Beloit College, Wisconsin. Immediately after graduation I became an assi-tant to Professor T. C. Chamberlain, who was then in charge of an important branch of the United States Geological survey.
Q. When did you graduate?
A. 1881.
Q. Go on and state in your own way generally what experience you have had in the practice or teaching of your profession as a geologist since that time.
A. In 1882 I became instructor in Beloit College. In 1884 and from that time until 1890 I was professor of geology and some other things in that college, but geology was the thing in which I was most interested. I had a year and a half off during that interval.
1214 when I studied in Germany, a considerable part of the time being spent at Heidelberg University. After 1890 or in the fall of that year I went to the State University of Wisconsin as professor of geology there. I remained there one year, and went to Chicago at the time of the opening of the university there in the autumn of 1891. I have been at the University of Chicago since that time.
Q. In what position?
A. As professor of geology; one of several.
Q. And you still hold that position?
A. I still hold that position. Since 1881 I have been connected with the United States Geological Survey, giving most of my time for the first year, and only small fractions of my time since to that organization. For several years, indeed, I have done very little work, except occasionally a few days in consultation on some particular problem in the field. Since 1890 I have been connected with the New Jersey Geological Survey, but my active work there ceased some years since, though my nominal connection remains. Since 1910 I have a connection with the Illinois Geological Survey, but that also does not involve very much active work on my part; so that of late years my time has been given primarily to teaching, although in the summers I have been in the field every year. I am not a

mining geologist and I am not a mining engineer. I have done relatively little mine work, but I have seen a good many
1215 mines. I have been interested in some mines, and have visited them occasionally, and have been consulted in that connection now and then as to methods of development. I think that is about all.

Q. When did you first enter upon the examination of any of the properties in the Butte district, if at all?

A. I came to Butte for this purpose, for the examination of these mines, first at the end of February last, and was in Butte about three weeks at that time. I was here again in August something like two weeks, and did not return again until two days before the trial opened.

Q. During that time, those visits to Butte, was your examination confined to the properties displayed upon the maps here before us?

A. My examination has been confined especially, wholly to the two properties.

Q. Outside of your examination of the properties represented on the map here, if I understand, you have no familiarity with the Butte district?

A. None except that which I have gained through literature; no familiarity based on personal observation.

Q. How many days or weeks in all would you say you have devoted to the examination of the surface and underground workings displayed in the Elm Orlu and Black Rock claims?

A. Something like five weeks. And I should like to add here that, not being a mining engineer and not being a sur-
1216 veyor—for those reasons and because my time has been limited, I have not attempted to make such detailed maps as the mining engineers have made of the workings underground. I have tried to study general features rather than specific details.

Q. Have you, during that examination, visited and examined substantially all of the underground workings that were accessible?

A. The larger part, but not all.

Q. I wish you would state to the court in your own way, Mr. Salisbury, the conclusions you have reached as to the sequence of geological features in the territory covered by the Black Rock and Elm Orlu claims, and the territory in immediate juxtaposition therewith,—the relation of the cracks, one to another, relation of the veins, one to another, which you may have examined, and the character of country through which these veins cut, traverse.

A. My general conception of the sequence of veins and the general condition of the veins is not very dissimilar, in effect the same conditions, as those which were described by one of the witnesses for the plaintiff and one of the witnesses for the defendant. As I conceive them the starting point, so far as the immediate history is concerned, is the intrusion of the granite into whatever was here at that time, into which that might be intruded. Then, later, this granite was intruded by aplite in a very irregular fashion, and that condition I conceive, of the intrusion of the aplite, may not have been

very much later than that of the granite itself. Subsequent to this intrusion of the great granite mass there seems to have been developed a system of east-west fissures, not simple fissures, but somewhat complicated fissures, which are not very accurately described by the name "east-west" because they do not run very—they are not very straight and at places depart greatly from the east-west direction. Following the development of these fissures, which may or may not have been great vein faulting, I have no such evidence that would con-ince me one way or the other—following the development of these fissures mineralizing solutions appeared to have entered the fissures, not only the main east-west fissures, but all the branches and conjugated fracturing which developed at the same time, and this mineralizing process I conceive went on for a considerable length of time before another set of fissures, descriptively called in the region the northwest fissures, were developed. I have not studied the northwest fissures much, but so far as I have seen them I should not dissent in any particular from the statement which Dr. Irving made concerning them, and that statement was that the process of mineralization which started after the development of the east-west fissures continued until after the northwest fissures were developed and proceeded into those.

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Q. In your opinion, the mineralization, as I understand you, in the east-west fissures commenced before and continued for some time after the opening of the northwest fissure?

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A. Very likely they commenced before the mineralization of the northwest fissures, but the two ended probably at the same time or something like it. This would entail a shorter period of formation for the northwest fissures than for the east-west fissures. And, what I believe is also important—is also of importance in this connection, a shorter period of time for the alteration of the granite adjacent to the two sets of fissures; so that I conceive that the alteration of the granite adjacent to the east-west fissures has been considerably greater than the alteration of the granite along the northwest-southeast fissure, so far as I have been able to observe them, and the latter is very limited.

Much later than this the region was faulted by a great fissure, or perhaps I should say there was great faulting along a great fissure which has come to be known as the Black Rock fault or fissure. This fissure, as I take it, followed old lines of weakness, as fissures generally do when rock is ruptured. This Black Rock fault, is as I understand it, a very complex fault. It is not one simple fissure. It is probably single in some places, branching in other places, and these branches perhaps uniting at some distance from the point of their first development along the strike. This faulting is, I take it, very much more complex even than that statement would in-

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dicate and if I may do so I would like to make a little sketch which illustrates what I conceive to be the situation. I understand the sort of movement which took place during this faulting; I think we mostly understand the condition of the ground at the time the faulting took place. Let us suppose that this area represents a tract in this region which includes these two mining claims

and surroundings. This had already been affected by a system of east-west faults which ran northeast and southwest. These fractures were not very regular and they were probably not so simple as single lines would indicate. That is, I think that in many places no doubt there were branches which shot off and united again.

Q. You are referring, as I understand, to the east and west fissures?

A. East-west fissures. There were other branches probably which shot off and never united. There were—there was probably a vein development of the east-west fissure more or less of a conjugated fracturing which has already been referred to. Assume that by means of this main east-west fissure and these more conjugated fractures which had been developed, the whole country had been converted vertically into a series of blocks of irregular form in many cases and that these blocks had been partially re-cemeted by the mineralizing solution, after they had been developed, but that these lines of breakage had not been so perfectly glued as to make
1220 the whole thing one strong mass, as the granite was before it was fractured. Then, I conceive that later, at the time of the Black Rock faulting, stress had accumulated in such way——

Q. Before going to the Black Rock faulting, have you anything to say, Mr. Salisbury, about the northwest-southeast faults or fissures?

A. That had, of course, according to our conception, affected the region, but by way of keeping the diagram relatively simple I can illustrate the point I wish to make without introducing that. If, now, we had a series of blocks on a table, fitted together, the blocks being somewhat irregular as to their boundaries, and we displaced half of these blocks, let us say, by movement to one side, it would be impossible to do that without disturbing all the blocks of the whole system. I think much the same takes place in the earth. Here are a series of blocks with certain lines of weakness. If the Black Rock fault in going through in this direction here, in the shove in this way, it may be called, there is a twisting movement—in any case with or without the twisting movement, this irregularity of surface will cause greater pressure on the parts of such a block, for instance at this point, than at this point; and these movements—and as this moves by this, will be forced in this direction, supposing the main movement is in this way. This will be twisted in this direction, which will result in a twist in this direction. In other
1221 words, the whole block is twisted a little in its surroundings and I conceive that all of these blocks adjacent to the Black Rock fault were twisted a little in their surroundings at the time the great fault itself was developed, and I think that is the explanation of these many little slips that are found, some of them somewhat parallel to the main vein; some of them branching off in various directions.

Q. You mean within the boundaries of the Black Rock and Elm Orlu also?

A. Not only within the boundaries of the lode but outside of the lode.

Q. And how numerous are those slips?

A. Very numerous; I wouldn't say how many.

Q. Could they be counted by the thousands?

A. They could be counted by the hundreds at any rate in either mine.

Q. Proceed.

A. Naturally, these little slips, like the old ones, followed old lines of weakness; and I think they probably followed those conjugated fracturings—fissurings which were developed at the time *of* the east-west fissures were developed. Personally my conception of the vein is that where this faulting and this movement took place, assume that to be where we will say the Black Rock fissure goes through, generally with its offshoot, sometimes two and three strands, sometimes one only, that these little movements are, in a generic sense, to be associated with that main movement.

1222 Q. These offshoots from the main Black Rock fissure, these minor ones that you spoke of, are they parallel or sub-parallel to the main line of fracture of the Black Rock fault or do they make off in a larger angle from it in places?

A. They do both things. They are sub-parallel, they diverge at various angles. My conception is that simply with that movement that took place all of these blocks were more or less thrust on one another and developed as here it was along the planes of thrusting and movement. That, I think, explains why, in construction at least, these gouges all seem to be about the same thing.

I conceive, further, that it is quite probable that the perfect adjustment of these blocks among themselves may not have been immediately accomplished when the main fracturing took place but there might have been left strands which subsequently eased themselves by slight movements on these minor masses. Indeed, I do not suppose the Black Rock faulting itself all took place in one day or in one period. It probably extended.

Q. In your opinion could that process of adjustment continue over a long period of time after the first opening of the Black Rock fissure?

A. I think it might have done so. I think it might conceivably have continued to the present time.

Q. Proceed.

1223 A. That represents the general situation, I think, as I understand it in the region.

I would like to say one or two other things with reference to veins. It has already been brought out in the testimony that the doctors disagree with reference to the boundaries of the veins. I think that is inevitable and I do not believe that they would be altogether honest if they agreed completely, for reasons which I should like to illustrate. First, I will draw some vertical sections through veins. Let us suppose that there is a fault slip between a body of rock on one side and a body of rock on the other. We will suppose that subsequent to the development of that fault—I don't care whether it is fault slip or not—it is a fracture—mineralization takes place and

completely fills the crack, if there was one, displacing the rock more or less adjacent to it, and if that displacement is quite complete out to a certain point which is well marked, perhaps by another fracture on the other side, then all the doctors would agree that these are the limits of the vein, if this is fresh granite on this side and this is fresh granite on this side. I speak of "fresh granite" because that is the rock here. Any other rock would do as well. But suppose, second, we have an equally well defined wall on one side, that mineralization takes place along it quite completely here, displacing the rock, and less completely out here and further out there come to be little stringers of granite in between the part that has been
1224 displaced, and this gets smaller and smaller, and rock out here, we will say, "granite altered," but out here "granite altered over 2," meaning that it was one-half altered, nobody would know just where to draw the limit of that vein.

Q. As I understand the gradual fading out as you proceed from the fissure?

A. Gradual fading out of the mineralization and a gradual reduction of the alteration of the granite itself, so that there is no sharp boundary. A third case might be illustrated something like that, right below it, with a greater variation. Suppose this is the wall, as in the other case, then I will say that is a vein which has one well defined wall, the other badly defined. Suppose in this case a well defined wall on this side were mineralized through here and then through here partly mineralized and the granite one-half altered—if the matter ended there we should be more or less in doubt as to where to put the limit of that line, but if there came in here at this horizon a well defined zone of mineral matter with fresh granite beyond, that would serve just as well as if there were a great fault there—if there were fresh granite here and this granite all in here altered or semi-altered, we should have no hesitancy I suppose in putting that all into the vein, if these zones of mineralization were rather frequent, and the change to the fresh granite there sudden.

But there is one other case which I should like to illustrate
1225 and that is this: Suppose a well defined zone of mineralization—we are still looking at a vein across—a vertical section across a vein—the mineralization fades out on either side, the streaks of mineral matter become less and less, the granite between them becomes less and less altered and passes off by graduations into granite which is not altered at all, now I submit that the doctors would probably disagree as to where the limits of that vein ought to be drawn. We will say that within this region the granite is altered; that within this region the granite is one-half altered; that within this region the granite is half altered; that here the granite is fresh and here the granite is fresh. There are no boundaries to the vein.

Q. No definite boundaries?

A. There are no definite boundaries, and if one man says it is fifty feet wide and another man says it is only forty feet and another man says it is only thirty feet wide, they may all be perfectly honest and perfectly sincere in their opinion; it is simply a question of judgment as to where you should draw those veins.

I should like to illustrate one other case in the form of ground plan instead of sections. Suppose there is a well defined vein running in this direction, a vein that is very definite, that everybody would agree upon. That vein might then break up into various little stringers which are not very distinct and these little stringers might themselves break up until we have a sort of stock work
1226 of vein, mere little bodies, mineralized rather incompletely we will say, and that the granite is altered in that region. If we had only that much exposed, no man would know where to say—at least I should not know where to say that this vein ended, going in this direction. And there, I think, we might honestly disagree. But if, on the same ground plan, there were another vein coming in here, very distinctly, from this side, and breaking up and making a stock work here, then I think we could be likely all to agree that we were to include this in the lode which runs out beyond. That I submit is something of my conception of the situation on the surface of the Black Rock claim west of the discovery shaft.

The sketches made by the witness in illustrating his testimony previously given, admitted in evidence and marked Defendant's Exhibits 110 to 112 inclusive.

Q. Mr. Salisbury, at the adjournment last evening you had sketched a hypothetical vein crossing, we will say, easterly and westerly and then scattering out into branches and fading out, and another approaching it in the opposite direction and with a like spreading out, and stated what your conclusion would be as to its identity and unity, of such vein and such development, and were about to apply it to some condition found in the Jersey Blue
1227 or Black Rock vein at the time of adjournment. I wish you would take it up and proceed, please.

A. Here is the well-defined Black Rock vein.

Q. You are referring now to defendant's exhibit 64?

A. Defendant's exhibit 64—which continues eastward until near the co-ordinate 65—section 25 and to that point is represented in the same way on the plaintiff's exhibit which corresponds to this one, No.—I do not know what the number is. Here the main vein of the Black Rock as I understand it, as I see it, turns somewhat northward and is somewhat a distinct vein for a considerable distance. Then a little farther east it passes up into a sort of stock work with numerous stringers which are not very large and the tracing from that point on to the discovery tunnel has to be through a body of material which corresponds——

Q. You are now turning to exhibit 65?

A. Exhibit 65—which corresponds in a general way with the hypothetical representation which I sketched yesterday. All of these bodies of material from the point where the well marked vein ends on to the position of the discovery tunnel is thoroughly altered granite, affected by numerous stringers and small bodies of quartz. No individual strong vein is observable through to the discovery shaft, but the whole body of material is altered.

1228 The Court: Will you point out the discovery shaft there; I can't see it.

A. The discovery shaft is right here.

The Court: On the exhibit below?

A. On the exhibit below I can show it approximately. It is not marked, but it is approximately near the section 28—I see it marked here on this sheet, your honor, at this point about 25 feet east of section 28.

Mr. Dickson: Section line 28?

A. Yes. From the discovery shaft eastward a new opening follows at points which make it quite clear that a vein lies in that position, but the present opening is through old workings so that the vein itself, much of the vein itself is not distinctly seen. Both plaintiff's and defendant's exhibits are in apparent conformity—approximate conformity at least out to a point midway between—nothing here by which to designate that accurately.

Q. Station 1119?

A. Out about to station 1119. Here there is a vein running off to the northwest accompanied by a slip, but distinct vein matter runs on east through this portion to station 1111. From station 1111 to the mill tunnel there is no strong individual vein.

Q. You mean the drift running westerly from the mill tunnel?

A. The drift running westerly from the mill tunnel follows a small vein which is distinct, though small, in about to a point
1229 midway between stations 1110 and 1109. Then from a point near 1110 to a point near 1111, I was not able to follow a perfectly distinct individual vein, but there is quartz at various points in that interval, and the whole body of the rock in the vicinity is thoroughly altered, and there is only a few feet of interval there where a somewhat distinct band of quartz cannot be followed. From station 1111 westward the vein is distinct, and that vein has been driven on a short distance to the southeast from station 1111, and the course of that vein at that point determined, and it corresponds with the strike of the vein near the south end of the mill tunnel, and is doubtless connected with it. So that from the mill tunnel westward there is by means of distinct individual veins or by means of thoroughly altered granite, much mineralized, a connection through to the discovery shaft.

Q. I think that piece of work, Mr. Salisbury, might be more properly described as a cross cut from the mill tunnel and a drift from the cross cut?

A. That would be a better description. It is in the cross cut from the mill tunnel that these veins represented on this exhibit are seen.

Q. Have you been able on the surface or in other work or any other way to trace the vein beyond that in its course easterly?

A. I have not traced it easterly of the Black Rock claim.

1230 Q. I mean beyond the cross cut from the mill tunnel, have you traced it across the east end line?

A. I have not seen it beyond that point, but that is only a few feet from the east end line.

Q. About what is the width of the altered granite disclosed in that

cross cut from the mill tunnel, including all of the parallel seams that are crossing the cross cut as represented on Exhibit 66?

A. This is one of the cases, your honor, where there may be some differences of opinion as to just where the limits of the lode should be drawn; but I should say that 50 feet from the drift to the south would be a reasonable place to locate the south border of that lode. That means that for a distance of 50 feet the rock is thoroughly altered, and that crossing it at numerous points—several points—there are distinct veins, smallest veins of quartz and manganese, but a number of them. Beyond this point, some 50 feet south of the drift in the crosscut, the granite is essentially unaltered, or but little altered. I might simply add that the southern most vein crossing this cross cut at the time that I was last there seemed to be a fairly good boundary for the lode.

Q. I wish you would refer to your notes on that subject and see if there is anything further that you wish to say.

A. I think there is nothing else I care to say.

Q. I wish you would explain briefly the process of replacement in which the country rock is altered and replaced and con-
1231 verted at times into ore—when I say ore I mean commercial ore.

A. I think it should be very clearly understood that the development of a fissure, whether accompanied by faulting or not, is not the same thing as the making of a vein. The fissure must be there first, and the vein is made afterwards. When the mineralizing solutions come up from the deep, they contain many things in solutions, among others, metals and quartz and manganese, and in some cases fluorite. These substances in solution are more or less active chemically, and they attack the mineral of the granite. They decompose the felspars; then decompose the micas, making new minerals out of the old ones with the addition of the things which are in solution to some extent. Some of these new compounds developed are soluable—they are all more or less soluable, and some of them are readily dissolved and taken away, and in the place from which they are taken substances from the mineralizing solutions are left, so that, molecule by molecule through the centuries and through thousands and thousands of years, the felspar and mica and to some extent the quartz are replaced by the things which are brought up by these solutions. In many cases the structure of the rock as it was, is retained in the mineral vein. In places the substances left are zinc or galena or what not; in other places they are quartz or manganese or something which is of commercial value, and I think no one
1232 can say—certainly I cannot say—why metals are left at this point and manganese and quartz at the other points, but such is the fact. An analogy which is readily stated, I think, is the petrification of wood. We have in many places in the world great logs or smaller pieces of wood, as the case may be, replaced, molecule by molecule, with mineral matter deposited from the solutions in the circulating waters, so that we have the complete trunk of a tree, as far as form is concerned, remaining, but not a molecule that was originally in the tree itself; everything is replaced.

Q. Directing your attention to the Jersey Blue or what we call

the Black Rock vein and to the Rainbow lode as designated by our friends upon the other side, have you reached any conclusion, Mr. Salisbury, as to whether these two are of the same or different age?

A. I see no reason for thinking them to be of different ages and every reason to think they are of the same age.

Q. Give some of the reasons for your conclusion in that regard.

A. In most cases the faulting follows the development of the veins.

Q. What faulting do you now refer to?

A. The faulting that accompanies these veins; the faulting in the Jersey Blue vein of the plaintiff, that is the faulting of the Black Rock vein of the defendant; the faulting of the Elm Orlu vein of the defendant, which is the same as the Rainbow lode of the
1233 plaintiff. The faulting follows the mineralization in both and my reasons for saying that, is that the gouge in both is to a considerable extent made up of the vein material, it is the product of the grinding which came from the slipping after the mineralization and I know that to be so because the minerals are ground up in visible fragments in the gouge itself, and this gouge is in a sense the product of the grinding, and you cannot get flour from the wheat until you have the wheat; you cannot get this gouge made up of mineral matter unless the mineral matter were there first.

Q. You think these conditions could have been the result of a post-mineral fault?

A. I am certain of that. In evidence I should like to submit these specimens. May I explain to your honor that when these specimens were taken from the mine the larger part was soft clay material, because it was wet. Now, that it is dried it seems hard; but in the midst of this soft gouge sulphide ore is distinctly seen.

Q. Where was that taken from?

A. This was taken from a point in the Black Rock lode thirty feet east of the Dewey raise, in the Black Rock tunnel.

The Court: Is that supposed to be typical of the bulk of the gouge?

A. That is typical of the bulk of the gouge. There are places in the midst of these specimens—if I were asked to locate places
1234 where they could be well seen I should answer that you could hardly go into the mine and examine the gouge at any place for fifty feet without finding it.

Q. Is that true of both veins?

A. That is true of both veins; essentially true of both veins.

Q. And where is that gouge found in the Black Rock vein; what part of the vein?

A. Most commonly on the north. It is in places in the vein; it might be found on the south. There is no constant position for it.

Q. What fault is that in your judgment?

A. That is a branch of the Black Rock fault.

Q. Did you find gouge containing fragments of ore and other material in the gouge that you found in the Elm Orlu vein?

A. The same as in the Black Rock.

Q. And that is found along a fault?

A. It is.

Q. What fault?
A. The Black Rock fault.
Q. A branch of the Black Rock fault?
A. Yes, as I interpret it. Further, with reference——
The Court: Just one question. Where do these specimens of gouge come from, what vein?
A. The Black Rock vein, from the Black Rock tunnel thirty feet east of the Dewey tunnel.
1235 Mr. Dickson: Have you any similar specimens taken from gouge in the Elm Orlu vein?
A. I have not similar specimens here. They could be very easily procured.
Q. Proceed?
A. Another reason for thinking that these veins are contemporaneous is the fact that the alteration of the rock adjacent to each is of the same sort and has proceeded to about the same extent. The alteration is about as great in the one case as in the other case. That would be, to my mind, a somewhat strong reason for thinking that they are contemporaneous. If the Black Rock vein were distinctly younger it would have been I think subjected to alteration through a much shorter period of time, and therefore the alteration should have to be less; or it might be, if the alteration were less, if this were a very small vein, the alteration should have to be less perhaps in the same length of time. But this is not a small vein, it is a large vein.
Q. The Black Rock?
A. The Black Rock. Then another reason for thinking that they are of the same age, to my mind, is that, as I see the matter, they merge on strike and on dip and that the mineralization in the two veins is, so far as I can see, identical. Then there is another reason which, to my mind, is a very strong one for thinking that the two veins here are of similar age, and to illustrate the point I
1236 should like to make use of defendant's exhibit F-3, a piece of wood. Here are two principal planes of disturbance which to my mind represent in a general way the Black Rock plane or the Jersey Blue plane of disturbance and the Elm Orlu plane of disturbance, with this criss-crossing through them. Now, I think these cross cracks, these conjugate fractures were developed at the time that these two veins were developed. These two fissures were developed—the veins, afterwards—I do not think that cross conjugated fissuring of this sort would be developed at any time other than that when this incipient, thick fissure and this were developed. In all experiments on wood and on rock and on glass and other substances that is the situation. This plane of disturbance and this plane of disturbance and this cross disturbance came at the same time. In this particular case this is all the result of one movement, or movement at one time under pressure. I think that is the same here.
Q. You might refer to one of the level sheets, the 1300 I think of the Black Rock.
A. On defendant's exhibit 80 the main Black Rock vein has a

neral east-westerly course, but branching off from it to the south-
ward west of the Black Rock fault are numerous stringers,
hich as I understand it, represent those conjugate fractures com-
g off. If these were later material they would be likely to go
through to the other side, but most of them seem to stop and
merge into—they don't butt up against the Black Rock
vein so much as turn in and merge with it, as they doubtless
they were made at the same time.

Q. Being down another level, defendant's exhibit 78. I wish
u would indicate on this exhibit, Mr. Salisbury, where these
ringers and cross fractures extend from the Jersey Blue vein
the north wall of the Jersey Blue vein, where as I understand
u they turn and merge and follow with it, to the Elm Orlu vein,
aking a connection through?

A. I think I have very little to add to that which is shown on
e map. It should be stated I have not traced, and in most cases
e one has I think, traced an individual seam of this quartz right
round into its junction with the Elm Orlu. Workings do not
ermit of that. But such workings as we have, seem to show very
learly the divergence of these little veins and veinlets, as they are
n some places, from the Black Rock vein off to the southeast and
here are similar suggestions of divergence from the north side of
he Elm Orlu and I should like to make much of the point that
hese cross fractures do not come up and abutt against the Black
Rock but they turn and merge with the Black Rock. I think those
re the principal reasons which I have in mind for thinking that
he two veins are of the same age. Perhaps I may add, if it is
roper to add it, that I did not know until I came to Butte ten
days ago that there was to be any contention that these veins,
ere these two veins were of different ages and I should like to
ay that a difference of age had never suggested itself to
e until that time.

Q. Turning to the fifth subdivision, skipping the fourth, of the
rder in which you had concluded to discuss the case, give the re-
ult of your observation? I will ask you if you find at any place
he Jersey Blue vein faulting or crossing on its course and strike
he Elm Orlu vein?

A. I have nowhere seen the Black Rock vein crossing the Elm
Orlu vein.

Q. Have you examined with care, Mr. Salisbury, a number of
he places where the witnesses upon the other side claim they have
most satisfactory evidence of such crossing?

A. I have examined such places, both before I knew that there
was any claim of crossing and since that time.

Q. I wish you would take up the first place that you have exam-
ined, what you have noted here on the adit level, as shown on plain-
iff's exhibit No. 4, the surface map; there is represented upon ex-
hibit 4 a fault of the Jersey Blue, and it is contended or claimed
n the part of the plaintiff that one segment of the faulted Black
Rock vein is found westerly or northwesterly of the Black Rock
fault, and another segment of the Black Rock vein found south-

easterly of the Black Rock fault. What, if any, evidence is there of such faulting?

1250 A. On my map I have not represented that which is represented on exhibit 2 as the Black Rock vein—as the Jersey Blue vein—I have not represented that as a vein at all.

Q. What part of it?

A. The south branch. There is a fault there along the line, along the Blue line which plaintiff's exhibit 2 brings down to the Black Rock fault.

Q. The green line?

A. The green line. There is a distinct fault there and there is quartz there at various places but as I saw it that quartz did not follow in the direction of the strike.

Q. Which way does it go?

A. I will have to refer to my notes. I have represented along this south branch of the Jersey Blue vein, as represented on Plaintiff's Exhibit 2 a series of quartz veinlets running in essentially an east-west direction.

Q. What workings are there to disclose or expose what the plaintiffs have called the faulted segment of that vein southwesterly of the Black Rock fault?

A. There is there a little drift following a fault. That which is in the little drift, however, according to my interpretation, is not a vein.

Q. What is it?

A. That is a fault, accompanied again by some crossing veins of quartz, but I did not represent that as a vein and I do not now so gard it as a vein.

1260 Q. Have you anything further to say describing of it?

A. Simply that it is a slight fault slip of the ground typ of the many little slips which must accompany any great movement like that of the Black Rock fault.

Q. Do you consider that or do you think it might reasonably be correlated with the Black Rock fault in any way?

A. In time, yes, as a little strand or a little south branch. I must remember that a great fault like the Black Rock fault must necessarily displace all the adjacent blocks of ground, and I should consider that such a displacement.

By the Court:

Q. Ground level, Exhibit No. 61 and that work southwest from the Black Rock vein and across the Black Rock Flat Cross, that little drift which the witness says follows a fault or slip, who did the work?

The Witness: I don't know.

Mr. Dickson: I think it was done by us at the request of the Flat Cross people.

Mr. Gray: That is correct; it was done by the Santa Eugenia for us from point 611, clear down to the Black Rock fault, and also on the south side of the Black Rock fault.

The Court: Proceed.

Q. The Clark tunnel is shown on this map Exhibit 65 and it is explained by Plaintiff's witnesses that in cross cut No. 4 which is encountered by the Clark tunnel there is found a faulted segment of the Black Rock vein, and again that same faulted segment is found in the drift running southwesterly and marked No. 25; what have you to say about that?

A. That drift No. 4 across the Clark tunnel, there there is a vein something like two feet in width made up partially of quartz and to a larger extent of ground up and altered granite, a distinct, but not large vein. I should not be certain that this connects with drift 25 from the Black Rock tunnel, though it might do so. A vein is distinct and readily recognizable in that place, but I should never have thought of correlating it with the Black Rock vein west of the fault.

Q. Why not?

A. Because of its position, which is coincident with that, unless there is a fault—unless it is faulted, which I don't think is the case; because I don't think the Jersey Blue vein, that which crosses this; and apart from those reasons because it is not anything like the Black Rock vein.

Q. In what particular?

A. In its size. This is very much smaller. I have put it down on my map as a small vein. The Black Rock vein is a great vein.

Q. What do you mean by a great vein?

A. Oh, one that is fast wide; that is six, eight, ten or twelve feet wide. There is no especial limit to what I might call a great vein, but a large, distinct vein, which averages as many feet wide on the whole as the Jersey Blue veins of the plaintiff's southwest of the Black Rock fault do inches. It is as many feet wide as these are inches wide, or something like that. That is probably not a very mathematical statement, but it is very much larger.

Q. You mean the Jersey Blue vein southwesterly of the fault as claimed to exist by the plaintiff's witnesses?

A. As claimed by the plaintiff's witnesses, yes, sir.

Q. On Defendant's Exhibit 67 on the 450 foot level of the Black Rock it is claimed by the plaintiff that in the drift running from the 431 cross cut near station 80 and running thence westerly through station 69 and on to an intersection with the Black Rock fault, that there is another place where this vein, the Elm Orlu vein has been faulted by the Black Rock vein. Do you subscribe to that?

A. I do not.

Q. Will you inform the court why; give all the reasons why you think that is not the case?

A. In drift 450 of Defendant's Exhibit 67 there is a little dip accompanied by gouge. On my map I have not represented it as a vein, and my map stands as it was made before I knew that this was claimed to be a vein. There is a bit of quartz at the south side of drift 450 as it starts westward from cross cut 431, but I was not able to trace any vein of quartz through that drift. There is a fault in that drift.

Q. Before you get to the fault in the drift, what disclosures of quartz or vein material is there in that drift, apart from the place that you have referred to, where drift 456 starts out from 451 cross cut?

A. I have marked a bit of quartz at two or three places.

Q. Explain to the court what you mean by a bit of quartz; what was the magnitude or thickness?

A. I have not recorded that on my map, but my memory is fairly clear about it, that there are small bits of quartz which I interpreted as possibly bits of drag material along the vein.

Q. Well, go ahead about the fault in that drift?

A. The fault runs through the length of the drift, and near its west end on the north side there is a distinct and heavy blue gouge, which can be distinctly seen to turn off to the south in the direction of the main Black Rock fault. It seems to me to join it and become a part of it.

Q. The fault in this 456 drift?

A. Yes. I should like to say one other thing about it: This has been correlated by the plaintiffs with the vein in the Clark tunnel further south. The vein in the Clark tunnel, considerably higher, dips to the south, and therefore at the 450 foot level should
1244 be much further south than it is in the Clark tunnel. As a matter of fact——

Q. About what is the dip of what is claimed by the other side as the faulted southeasterly segment of the Black Rock vein as disclosed in the Clark tunnel?

A. Something like 80 degrees. And consequently, following down to the 450 foot level, it should be much further south than it was near the surface. Instead, this vein which is correlated with it is much further to the north.

Q. It is north of a perpendicular line from the place in 456 where they claim it to the place that they claim it in the Clark tunnel?

A. Yes.

Q. It is north instead of south of the disclosure in the Clark tunnel?

A. In other words, (drawing) here is the vein in the Clark tunnel, dipping a little in this direction. Now, some 400 feet more or less down we find another vein. This continuation should be down in this direction, and we find a vein over here somewhere which we are asked to correlate with that. The difficulty is illustrated by the model which was exhibited yesterday, Defendant's Exhibit 104.

(Sketch marked Defendant's Exhibit 113.)

A. (continued). Now, I know of no geology which would allow me to correlate a vein here, dipping in this direction with a vein here dipping in that direction.

1245 Q. Instead of the segment of the vein claimed by the other side to be in 456, if I understand you, it would be—which is north on that sketch?

A. To the right is north.

Q. If what is claimed by the plaintiffs to be a southeasterly faulted segment on the 450 level were in truth or ought to be or could be

correlated with the faulted segment that they claim to have in the Clark tunnel, the downward course of that faulted segment from the Clark tunnel must have changed from a southerly dip to a very pronounced northerly dip between those two levels?

A. Yes, and must have reassumed its southerly dip on the 450.

Q. Going to the 700 Black Rock, Defendant's Exhibit 70, 702 drift running westerly from 701 cross cut is another place, in the westerly end of 702 drift where it is claimed by the other side that there is found clear evidence of the faulting of the Elm Orlu vein by the Black Rock vein. Do you subscribe to that?

A. I do not.

Q. Will you state to the court the reasons why you differ from our friends upon the other side?

A. In drift 702 in Defendant's Exhibit 70 there is a vein accompanied more or less closely by a fault. This vein is a small vein, not at all comparable in size with the Black Rock vein to the
1246 west. The slip along this vein is marked by gouge. This gouge is in and out of the vein.

Q. Do you mean that it crosses it?

A. At the east face of the cross cut, east of the east end of the drift the slip is separated from the vein in the upper part of the face exposed something like 18 inches or two feet. In the drift itself the gouge is in the vein in places, and this makes it quite clear that the fault outside of the vein here and the fault inside of the vein here—make it quite clear that the fault took place after the vein was developed because it cuts in and out of it.

Q. Do you undertake to correlate the fault that you are speaking of with the Black Rock fault?

A. I interpret it to be one of these side movements between blocks which accompanied the main displacement of the Black Rock fault.

Q. The gouge then in 702 drift as you followed it westerly, does it cross the Black Rock fault or turn with it as it did on the level above?

A. The larger part of the gouge turns off southward, but the fault slip does fault the main Elm Orlu vein at that point, setting it off some ten feet or so to the west on the north side; but the main gouge seems to turn off and follow the Black Rock. Might I suggest here that I said yesterday that in a great movement like that of the Black Rock fault I conceive that all the adjacent blocks are twisted and turned on each other, and as I stated yesterday, I think that
1247 some of those adjusting movements might be delayed considerably beyond the time of the main slip, and that very easily a block might, in these later movements, be twisted so as to seem to fault the vein which accompanies the main movement itself.

Q. About what is the size of that gouge in that 702 drift, the thickness of it?

A. I don't think I have a note of that, but it was a thin gouge throughout the eastern part of the drift; I don't remember it distinctly at the west part.

Q. What material, if any, is there in the gouge; is there any-

thing in the gouge that was not originally in it, that was dragged in with it?

A. I don't recall on that point.

Q. What is the disclosure of quartz or ore or vein matter in that 702 cross cut; I mean with reference to its size?

A. It is a smaller vein; I am not sure that I have the dimensions—I have noted that on the wall of the cross cut opposite the mouth of 702 drift, that is, to the east, there is six inches of tight vein quartz with granite between it and the fault.

Q. Six inches of tight vein quartz; is there any gouge immediately in contact with it on the south side?

A. There is none whatever. At this point it is distinctly granite between. I should say that that gouge here is outside the vein, and that in the drift itself the gouge is in the midst of the vein,

1248 which is to my mind clear proof of the fact that it is subsequent to the vein, so that any displacement there may be of the main vein there is not a displacement by a fault which accompanies the making of the Black Rock fissure; it is a fault of very much later date.

Q. On plaintiff's Exhibit 13, the 800 foot level of the Elm Orlu, it is claimed, as I understand it, by the plaintiffs, that there is a place in the vicinity of station 108 where there is evidence of the faulting of the Elm Orlu vein by the Black Rock vein. Have you any observation of that point?

A. I have no specific notes of that point.

Q. Have you anything further to say upon the question, Mr Salisbury, or the claim rather, of there being any evidence of a faulting anywhere of the Elm Orlu lode by the Black Rock lode on its strike, or respective courses?

A. I know of no evidence which seems to me at all conclusive on that point. Indeed, I should say all the evidence which I have is to the contrary, essentially.

Q. Have you examined the ground on the north boundary at parts of the Black Rock fault, accompanying the fault, which you have testified in your judgment is a branch of the Black Rock fault, to see whether there has been any evidence of displacement by the vein action of that gouge?

A. I have nowhere seen any displacement of the gouge along the Black Rock vein by mineral matter.

1249 Q. I think you have already covered, Mr Salisbury, everything else under sub-head 4?

A. I should like to make just one further suggestion and that is that in my judgment all these branches of the Jersey Blue vein as claimed by the plaintiff southeast of the Black Rock fault are so much smaller, are accompanied by so much less alteration of the granite adjacent, that I should never have thought of correlating any of these at any point with the main Black Rock vein northwest of the Black Rock fault.

The Court: Are you familiar with the Deadwood vein?

A. Somewhat. I have seen it but I have never studied it carefully.

The alteration of the rock accompanying that vein is very much less than the alteration accompanying either the Black Rock vein or the Rainbow lode.

The Court: Have you data enough to tell us how it compares on the two sides of the Rainbow or the Elm Orlu-Black Rock vein?

A. I have not been able to satisfy myself very well about the Deadwood vein southeast of the Black Rock fault.

Mr. Dickson: It is also claimed by the plaintiffs that the Black Rock in the dip or downward course intersects, passes through and on beyond the south wall of the Elm Orlu vein. Have your observations brought you to that conclusion?

A. They have not.

1250 Q. Will you explain to the court why, in your opinion, that is not a correct interpretation of the fact as disclosed in the workings?

A. I had seen some of the places before the trial began where it was thought by the witness for the plaintiff that these veins cross on dip. I had not made that interpretation of what I saw. After a part of all of the testimony for the plaintiff was in I revisited one of the places that seemed critical on this point. I went down the Clark raise from the 1200 to the 1300 foot level.

Q. Shown on defendant's exhibit 77?

A. Yes, and also 78.

Q. And is numbered what?

A. On the 7th floor down——

Q. You said you went down the 1300 on the Elm Orlu vein—the 1300 of the Elm Orlu?

A. 1300 of the Black Rock.

Q. Proceed?

A. On the seventh floor down from the Black Rock 1200, through the Black Rock raise there is a crosscut north and south through the Black Rock vein to the north and to the Rainbow lode of the Elm Orlu vein to the south. The raise is in the Jersey Blue vein. Here the Jersey Blue vein is dipping 72 degrees north at the bottom apparently with a tendency to become a little more nearly vertical. The north wall of the Elm Orlu vein to the south dips about sixty degrees north, both, therefore, dipping northward, but the Elm Orlu

1251 vein dipping more. These two dips are such that the two veins should come together about at the sill floor of the 1300 Black Rock. That floor is not now open to observation. I then went west on the 1300 Black Rock level—went east on the 1300 Black Rock level from the raise 12 or 13 sets and up to the second floor. On the second floor up from the 1300 level and 12 or 13 sets east of the Clark raise, there is well exposed the so-called crossing of the Jersey Blue vein of the plaintiffs in the midst of the so-called Rainbow lode of the plaintiffs.

Q. Crossing in what direction; in its downward course or on its strike?

A. Crossing it on its strike, as exposed in the back of the stope—or rather I should say that the crossing is not very evident. The two things seem to me essentially paralled at that place, but the thing

which seems, as I interpret it, to be the Jersey Blue vein of the plaintiff at that point is as I interpret it a slip through the ore of the Black Rock vein. The slip is distinct. It was stated, if I remember correctly, by witnesses for the plaintiff that the structure of the ore followed that slip. I do not so interpret it.

Q. What is your observation as to the structure of the ore there?

A. At the north wall of that great body of ore, the north wall of the Black Rock vein as I understand it, the structure of the
1252 ore is parallel with that north wall and the structure is very distinct there a width of some three or four feet. I didn't make any actual note of the specific distance, some three or four feet from that wall. Farther south, the structure of the ore ceases to be banded and I should speak of it as having the structure of the crack which it had displaced, of the structure of granite; it is blocky. This structure holds essentially, that is the structure which is the so called Jersey Blue vein crossing through this body of ore. This slip has a gouge and the two walls of this gouge are perfectly well defined. If you stand at just the right place and see the two ends of this gouge well marked, there seems, so far as these two lines are concerned, a structure of ore running in that direction, but I could not make out that there was structure other than that which seems to be outlined by the two walls of the gouge in that direction. And on the south again that structure does not seem to me to obtain. The position which I am speaking of is that represented on plaintiff's exhibit 22, somewhere near station 319. I cannot give the precise position, but that is approximately it. My observation, I may add, would be that this so-called Jersey Blue vein had a strike more nearly east and west than represented on this plaintiff's map.

Q. Exhibit what?

A. Exhibit 22. This, then, seems to be not at all a crossing of veins, but the so-called Jersey Blue of the plaintiff seems to be
1253 merely a fault slip through that great body of ore, a slip which was made after the ore was formed in place.

Q. When did you last visit the 1700 crosscut or the crosscut on the 1700 foot level of the Elm Orlu running northeasterly from the Elm Orlu shaft?

A. I believe it was Monday night.

Q. Of this week?

A. Of this week.

Q. Did you observe on this visit to this crosscut what the plaintiffs claim to be the Jersey Blue vein as disclosed on this crosscut?

A. I did.

Q. In your judgment could that be correlated with the Jersey Blue where you found it in the 1300 level?

A. I know of no principle of geology which would allow of that correlation.

Q. Will you give the reasons why in your judgment, it cannot be reasonably so correlated?

A. The Black Rock vein at the level next above this where it has been seen by me——

Q. What level is that?

A. The 1400 Black Rock—is a large vein of rich ore. It is dipping somewhat to the north. At the 1700 foot level of the Elm Orlu over to the south some 50 feet is the so-called Jersey Blue vein in place.

Q. On the 1700 level?

A. On the 1700 level. The Black Rock vein carried down from the 1400 foot level on the dip which it there has should be
1254 considerably farther north at the 1700 Elm Orlu level than it is at the 1400 Black Rock level, instead of which the so-called Jersey Blue vein of the plaintiff at the 1700 foot level is south. The same principle is involved that was shown by this small diagram, exhibit 113.

Q. In the Clark tunnel, in the 450 foot level?

A. Here on the Jersey Blue side we have a vein which has been run down——

Q. You are referring now to what exhibit?

A. Defendant's exhibit 85. The Black Rock vein, from some such level as the 1000 Black Rock, has been dipping somewhat to the northward at a very steep angle. Now, 200 feet farther down or so there is a vein dipping off in the other direction.

Q. Well, what vein is that?

A. The so-called Jersey Blue vein of the plaintiff.

Q. On the 1700 foot level?

A. On the 1700 foot level is dipping southward. Now, I know of no geology which would allow of a correlation of a southward dip vein there with a northward dip vein here. If the rocks were transparent you might be able to see through and see that connection. They are not and there are no workings to establish that connection.

The Court: No exposure between the 1400 Black Rock and the 1700 Elm Orlu?

A. No exposure; none that discloses these things. It is of course conceivable that this vein has turned in its dip and joins that
1255 one, but the presumption would be strongly against it. I should say that there is not one chance in a hundred, in my judgment, that that has happened.

Q. What is the dip of the Black Rock vein from the surface down to the 1400 foot level, as a whole?

A. For a considerable distance the dip is slightly to the south but in its general position for some hundreds of feet above this level the dip is very slightly to the north.

Q. I will ask you whether you have determined mathematically what angle of dip would be necessary to carry the Jersey Blue vein from where we have it on the 1400 foot Black Rock to the point in the 1700 Elm Orlu where our friends upon the other side claim it is found?

A. I have not determined that. It would not be a very steep dip the other way.

Q. Describe the vein as you observed it on Monday evening on that crosscut on the 1700 Elm Orlu level which is claimed by the plaintiffs to be the Jersey Blue vein at that level?

A. There is at the point represented on the plaintiff's map 26 a

distinct vein on which a short drift to the eastward has been run—southeastwardly, has been run. This vein is something like six or seven feet wide. It is accompanied by distinct slipping gouge on its north wall. The vein, if we say it is six or seven feet wide, is made up in considerable part of granite, altered granite.
1256 There is a considerable quartz in there, considerable rhodochrosite, manganese along with the quartz. There would be no question but that it is a distinct vein, but I should like to point out that it isn't anything like the Jersey Blue vein—anything like the Black Rock vein as we interpret it two hundred feet farther up.

Q. In what respect is it dissimilar?

A. The Black Rock vein above where last seen is rich ore, being stoped, is much richer than would be necessary for the lower limit of stoping. Here, there is little.

Q. Is that true of the Black Rock vein at its westerly end as shown upon the 1400 level, as shown upon defendant's exhibit 82?

A. That is shown by the extensive stoping as represented on the map.

Q. Proceed?

A. In the so-called Jersey Blue vein of the 1700 crosscut—Elm Orlu—there is little metallic substances. Indeed I saw no zinc. I would not assert that there was no zinc there, but there certainly is nothing of any consequences there in the way of zinc; it is not merchantable ore at all.

Q. Is it dry or wet?

A. It is dry.

Q. In that vein called by our friends the Jersey Blue vein on the 1700 level of the Elm Orlu—state whether or not that is the driest place disclosed in the entire crosscut?
1257 A. I don't know that I could say it is the driest place but it is one of the very dry places. It would be perfectly possible to stand in that drift with your maps and spread them out and work as you please without having your maps soiled.

The Court: Where is that?

A. In the drift east from the crosscut on the 1700 level. This point I suppose was contested because the witnesses on the part of the plaintiff have made much of the fact that the Jersey Blue vein is wet. Here it is dry. I am not suggesting this, your honor, because I attach much importance to the wetness or dryness; but the witnesses for the plaintiff seem to.

Mr. Dickson: When last did you examine, if at all, to ascertain where the north wall or boundary of the Elm Orlu lode or claim crosses the south side line of the Black Rock claim?

A. Monday night, I think it was, last Monday night.

Q. Had there been very recent work done there in that immediate vicinity?

A. There had been work done within a day or two.

Q. What was the working called, if you remember?

A. It is—I am not sure of the name, but it is a raise from the drift a few feet below the surface down from the McLeod shaft.

Q. Can you indicate it on the defendant's surface map?

1258 A. Defendant's exhibit 64. The raise that was driven to the surface is something like sixty feet west northwest of the west end of tunnel "E"—"tunnel" is the name on the map, but the word should be "trench."

Q. Surface opening?

A. Surface opening—that is it was open from below to the surface.

Q. Proceed?

A. The McLeod shaft, I believe it is called is a little east of station 1104.

Q. On exhibit 65; is that correct?

A. On exhibit 65. From the base of this shaft which was about 20 feet deep, there is a crosscut to the north some thirty feet or so from which a drift is run west and southwest. From a point which is about 45 feet of the shaft a raise was run on the border—on the hanging wall of the lode up to the surface—an inclined raise about thirty feet in length. The upper six feet or so of that raise is in loose surface material, weathered debris, so that the hanging wall of the vein could be traced to only within about six feet of the surface, where it is overlaid then by debris. The crossing of the south line of the Black Rock claim by the hanging wall of the lode at that point is at a position about 190 feet from the southwest corner of the Black Rock claim, and I should like to say right there that in Mr. Finch's testimony the other day he gave that figure as 305, but at the time that he made this statement the opening had

1259 not been made and this position had not been determined.

Q. Is that raise farther west than developments were at the time Mr. Finch was on the stand?

A. I can't say as to that point, but the raise had not been driven.

Q. I wish you would state briefly the reasons you have, from your observations, of fixing that point as the northern boundary wall of the Elm Orlu vein?

A. Upon this raise which has been referred to the top of the hanging wall of the vein is almost exactly under the south side line of the Black Rock claim, dislodging about six feet of surface debris, so that that seems to fix the crossing of the lode at that point.

Q. What was disclosed there?

A. There was a body of quartz, manganese vein at that point, and the surface is a very distinct surface which could be followed—plain surface which could be followed from the drift, from the bottom of the drift where the raise begins right up through the raise to the top.

Q. From the bottom of this raise did you follow that drift easterly therefrom?

A. I followed the drift easterly, yes.

Q. And what was disclosed in the drift as you proceeded easterly?

A. That drift is all along in what I should regard as a part of the lode.

Q. Mr. Finch's statement was not 305; it was 205.

1260 A. Excuse me. I shouldn't have said 305. I should have said 205.

Q. Have you observed the structure of the ore in the various places in what is called the Rainbow lode?

A. I have.

Q. What have you to say as to that, Mr. Salisbury whether it varies or whether it is at all uniform?

A. Oh, it varies. I should say that the structure of the ore in the Rainbow lode is essentially the same in its general characteristics as the structure of the vein ore in the Rainbow lode.

Q. Do you find this in both veins where you have a structure of the ore transverse to the strike or course of the respective veins, or the veins respectively?

A. There are various points where that sort of thing is suggestive.

Cross-examination.

By Mr. Folsom:

Q. Dr. Salisbury, I understood you to say that you do not claim to be a mining engineer or a mining geologist, did I not?

A. That is correct.

Q. How long did you say that you had spent in the study of this property after you suspected that we were going to contend that the blue vein, as we call it, crosses the other?

A. I have been underground since that time—I can't count it up by hours—one day and one night and part of another
1261 night.

Q. Most of your time since you have been here has been spent in court and in consultation with your fellow doctors?

A. Mostly in court.

Q. You do not seriously disagree with the doctors on your side?

A. I think not.

Q. You do seriously disagree with the doctors on our side?

A. On some points.

Q. Have you familiarized yourself with the literature on this camp, dealing with conditions in this camp?

A. I have read it but not very recently except certain minor parts.

Q. Have you read the paper of Mr. Reno Sales, which was presented to the American Institute of Mining Engineers during the 1913 session?

A. I have, but not so recently that I should be able to quote from it extensively—or might not.

Q. Would you be willing to accept the conclusions—or are the conclusions of Mr. Sales generally accepted as proper interpretations of the geology of this district?

Mr. Dickson: I submit it is impossible for the witness to answer that question whether he would accept as a conclusive interpretation of the geology of this district any opinion of Mr. Sales, be-
1262 cause the witness says he is not familiar with the district.

Mr. Folsom: I will change the question.

Q. I will ask you if the paper of Mr. Reno Sales is accepted as good working geology by the geologists of the country, so far as this district is concerned?

A. I think it is regarded as a very reasonable interpretation.

Q. In your opinion would it not be reasonable for the court, where litigation doctors disagree to accept the tests of a geologist who has worked out the geology of the district for the purpose of paying dividends?

Mr. Dickson: I suggest that is not a question for the witness to answer but for the court to determine.

Objection overruled.

By Mr. Folsom:

Q. Now, I was trying to find out in what principal particulars you and the witnesses for the defendant agreed with the testimony or conclusions of the witnesses for the plaintiff. I understand that you agree in the first place that there is a vein crossing the west line of the Elm Orlu claim and continuing easterly until it crosses the south side line of the Black Rock and departs—at least a portion of it—through the north side line of the Black Rock claim?

A. A portion of it, yes, sir.

Q. You also agree that there is a strand or branch of that
1263 vein which we call the Pyle strand, which extends beneath the surface to a point approximately underneath the east end line of the Elm Orlu claim?

A. Will you state the question again?

Q. That there is a branch or strand of the vein and part of the same vein which extends easterly underneath the surface to a point approximately beneath the east end line of the Elm Orlu?

A. Yes. I will modify that answer. I have not seen that Pyle vein cross the east end line of the Elm Orlu.

Q. No, I said approximately beneath the end line. It is not shown to cross exactly.

A. Oh, yes.

Q. You also agree with the conclusions of our witnesses that there is a vein known as the Deadwood vein which is a northwest and southeast vein, do you not?

A. I do.

Q. You also agree with our witnesses that there is a vein which has been referred to as the copper vein, which is a northwest and southeast vein?

A. I do?

Q. Do you also agree that there is a vein or a portion of a vein which crosses the west end of the Black Rock claim in practically the position that we place it on our maps, and extends to a point at least as far east as where it would intersect with what we call the Rainbow lode?

1264 A. I should not like to use the word "intersect" there.

Q. Well, I did not intend to catch you at all. You recognize that there is a vein running from the west end line of the Black Rock at least to a point of contact there with the Rainbow?

A. I do.

Q. You recognize that the Deadwood vein, so called, and the so called copper vein and the so called Jersey Blue vein, or this last

segment that you have been referring to of the Jersey Blue or Black Rock as you call it are substantially parallel in their course?

A. I do not.

Q. Doesn't your model show that?

A. I think not.

Q. I don't mean at the surface; I am speaking of underground now?

A. I think the Deadwood vein has little representation on the model (Defendant's Exhibit 101).

Q. Well, so far as the copper vein, which you recognize to be a northwest and southeast vein, and the Jersey Blue, at least the part that you recognize, they are substantially parallel, are they not?

A. I think not.

Q. Are they not substantially parallel, the copper vein and the Jersey Blue as shown in the lower workings, what we call the Jersey Blue?

A. Sections of the Black Rock could be picked out which
1265 correspond in general with the copper vein in direction.

Q. Do you not know that one of the tests applied in determining to which system a given vein belongs in this district, is the strike and dip, as to whether it belongs to the Blue vein system or what is known as the older system?

A. I do, but if I may add also, I think it is not proper to try to reel all the geology of the Butte district into these two claims.

Q. But in a general way the recognized geology in adjacent mostly country is something to be considered, is it not?

A. It has a bearing.

Q. Are you familiar with the period during *what* the properties in the Butte district were worked before the blue vein system was discovered and identified as such?

A. I am not.

Q. What is the direction of the dip of the Jersey Blue vein or Black Rock as you call it—what would be the general dip within the Black Rock claim from the point where it touches what we call the Rainbow lode to the west end line?

A. The total of the dip is nearly vertical. In the upper section it dips slightly to the south, and in the lower section slightly to the north—well, where I say slightly perhaps I should say very steeply in both cases. It is nearly vertical.

1266 Q. Is it not one of the distinguishing characteristics of the Jersey Blue, or rather of the Blue vein system of blue veins, that they are alternately broad and then narrow?

A. I could not answer that question from personal observation.

Q. You made considerable point of the fact that on the west side of the Black Rock fault the Jersey Blue was a vein of some considerable width; you said of several feet; and on the east or south side, as we claimed it, it only had a width of a few inches, did you not?

A. I did not put it that way, sir, sir. The statement as a rough or general statement——

Q. That is what I mean.

A. —was that it is perhaps as many feet with as the modified extension to the southeast was inches wide.

Q. Have you examined any of the veins of the southeast series in this camp excepting what we claim to be one of them here?

A. Not in detail.

Q. Those that you did study, did you not notice that at times they narrow down to a few inches for several hundred feet?

A. I did not, but I have noticed that all veins narrow down and widen out.

Q. So that the fact that on the opposite side of the Black Rock fault this vein is considerably smaller than it is on the other 1287 side is not conclusive to your judgment?

A. By itself, none can would not be altogether conclusive.

Q. Now, as to the points of disagreement between you and your associates and the witnesses who testified for the plaintiff. I understand that the principal differences are, first, that this vein which we call the Jersey Blue does not extend, as shown upon our map, from point 6040 to the Jersey Blue shaft?

A. I have nothing to say on that point. I have not examined that country.

Q. Second, that while the vein extends from the west line of the Black Rock, to, say, the point on the west side of the Black Rock fault, that no portion of the vein is to be found on the opposite side?

A. I think that is a point of disagreement.

Q. You admit, however, that there is a vein on the opposite side, at least one?

A. I admit that there are a great many veins on the other side, veins and veinlets.

Q. I understand that another point of difference is—as growing out of that same matter—that you do not recognize any place where the moulded Jersey Blue may be seen to cross the moulded Junction belt?

A. Yes.

Q. And I understand you to contend that there are no places where there is evidence of a crossing of any vein in the 1288 vicinity of where the crossing should take place?

A. I have seen no crossing.

Q. So that you differ on that point, not, as you illustrated yesterday, on the matter of theory or judgment, but as a question of fact?

A. I do.

Q. Another difference, as I understand it, between you and our witnesses, is to whether or not a portion of a vein in the Black Rock extends to the easterly end line of the Black Rock claim?

A. I believe so.

Q. It is your opinion that it does?

A. It is.

Q. And the only other difference—substantial difference in the court of crossing the south side line of the Black Rock to the Junction belt?

A. I believe that is also disputed, yes.

Mr. Dodson: There is another very important difference, that the Black Rock way on to dominant coarse interests and passes through and beyond the Station.

Mr. Watson: Well, I will assume. I must either go on this or dig.

Q. Did you see the sketch that Dr. Symons drew to illustrate the same point of crossing an alleged crossing that Mr. Smith had thus cause by a spade?

A. I saw the sketches as Dr. Symons drew them, but I [illegible] don't recall the precise sketch to which you refer.

Q. I will ask you if the Rainbow lode as we call — is not a reef lode, composed in its nature, substantially as described by Professor Irving?

A. I think it is.

Q. What is the width of the Rainbow lode at the widest place, where you observed it?

A. I have no specific figures in mind.

Q. Roughly?

A. There of course arises the question as to what is to be put into the Rainbow lode. In the most widely underlie the south line of the Black Rock east of the Black Rock fault there is a mineralized zone which is very wide, but I should not be willing to say that it is all the Rainbow lode; it is a very wide lode.

Q. It is as wide as 200 feet, is it not, in places, the stopes, 100 or something like that?

A. I believe the stopes approach 200 feet in width. I should not be willing to say that that is all Rainbow lode.

Q. What is the character of the so-called Rainbow lode as to continuity of mineralization?

A. It is mineralized generally, with unobservable ore in many places and without unworkable ore in places.

Q. What is the width of the Jersey Blue as we call it; what would be the average width of that ore?

A. It would be very hard to say; it varies from feet to feet [illegible] an inches and from feet to feet on dip.

Q. Could you give some general idea?

A. A considerable number of feet.

Q. Well, it varies from ten feet or less to ten feet?

A. It varies — its broad limit would be much above ten feet, very much above.

Q. How much?

A. Oh, several times ten feet.

Q. As you get away from the point where you say it unites with the Black Rock, how about its width; what would be your idea of its width?

A. I have no answer to make to that, beyond that which is shown on the section. There is something like 30 feet, for instance, there.

Q. What point?

A. Corresponding to about the [illegible] 600.

Q. On what section?

A. Section 31, Defendant's exhibit 40. Taking a measurement

further up, at the Elm Orlu 300 level or somewhere near there, I do, I should say, 15 feet, or something like that.

Q. What opening is that which exposes the width of it?

A. The 300 foot level of the Black Rock.

Q. Is it not a fact that the Jersey Blue, as we call it, is more uniform in width than the Rainbow?

A. Possibly, in the sense that it has less branching and is a little simpler.

Q. You said on direct examination that the Jersey Blue was frequently crossed by fractures of various kinds; will you name the places where you have noticed that?

A. I am not sure that I said that.

Q. I so understood you.

A. I think not.

Q. Is it a fact that the Jersey Blue is frequently fractured as you get away from the point of contact or intersection?

A. I suppose that is true of every vein in the world, including the Jersey Blue.

Q. Where is the Jersey Blue fractured substantially; give the places?

A. I did not speak so much, I think, of the Jersey Blue vein being fractured, as I did of the fractures proceeding from the fractures in which the Jersey Blue vein was formed.

Q. I did not understand you; I thought it was cross fractures. So far as you know, there are no considerable cross fractures of the Jersey Blue?

A. No notable cross fractures that run through and intersect it; at least I have observed none.

Q. Did you notice the walls of the so-called Jersey Blue vein with a view to determining whether or not there was as much alteration of the granite along the walls as there is in the granite along the Rainbow?

A. I don't think that I had that specific point in mind, but my general impression is that the alteration is comparable along the two veins. What does not mean that you could not find spots on the Elm Orlu where the alteration was much greater than at certain spots that could be selected on the Jersey Blue; but they are comparable, it seems to me, in quantity and quality.

Q. As a matter of fact, the Rainbow lode veins into the wall rock, does it not, here on one side and there on the other side, the boundaries of the vein?

A. In some places.

Q. Well, rather as you illustrated yesterday when you were showing the reasons why the doctor disagreed?

A. The boundaries are distinct in places and indistinct in places. The same is true of the Jersey Blue.

Q. Is that true of the Jersey Blue vein as you proceed easterly; isn't it much more distinct—the boundaries are much more distinct, or are there would be much less opportunity for doctors to disagree. Isn't it the case with the Rainbow generally; in other words, isn't the

granite on each side more altered along the Rainbow than along the Jersey Blue?

A. I should not like to say, or make a positive answer to that question one way or the other. I don't think there is a conspicuous difference.

1273 Q. When you were examining these veins particularly, when you made your exhaustive study of this property with a view to determining whether or not the veins were of a different age——

A. I have not claimed to have made an exhaustive study.

Q. Well, the most time that you put in,—you did not have this in mind then?

A. I did not have that specific point in mind, but I had the general character of the veins and their relations in mind all the time.

Q. I understand you to say that the dip of the Jersey Blue, so called, changes somewhat?

A. Very slightly.

Q. First to the south and then nearly vertical?

A. First to the south, then nearly vertical, and then a little to the north.

Q. Mr. Salisbury, you had a correction that you desired to make with reference to the width of the Jersey Blue vein at the point indicated this morning where you said it was forty feet wide; what is that correction?

A. In answering your question I simply scaled what is represented on the map at this level. There happens to be no working at this particular level. There is a little bit lower down a working, about the 1000 Black Rock, which shows the vein about thirty feet wide.

Q. About thirty feet?

A. Yes. There is no actual working at the point I scaled this morning.

1274 Q. How far west from the junction as you call it, or intersection or crossing as we call it, on the socalled Jersey Blue or Black Rock vein did you observe the vein on any level?

A. The west end of the claim ran somewhat beyond in one or two places, but I made no study of it west of the west end line of the Black Rock claim.

Q. How wide is the vein at the point where you observed it closely first, west—we are still speaking of the Jersey Blue?

A. Probably very different widths at different levels.

Q. Well, the extreme—just give us the extreme width?

A. The maximum?

Q. Yes, when I say maximum, where you really saw the width of the vein?

A. I should have to go to my notes, I am not sure that I have exact figures in all cases though. Something like fifteen feet—that is approximately.

Q. What is the width of the Jersey Blue in drift 422 Black Rock?

A. In drift 422?

Q. Yes.

A. I haven't these widths put down accurately in all cases. I will say what I have there.

Q. Approximately, as near as you can give it?

A. What number?

Q. 422 Black Rock?

1275 A. It is as wide as the drift is but that of course does not show the full width of the vein.

Q. Is there no crosscut there?

A. There is a crosscut on the west end, at the south; I haven't put down the actual width. My map simply indicates a good strong vein. You asked me before for the maximum width about what level?

Q. Yes.

A. And I said something like fifteen feet.

Q. And I want the minimum from now on?

A. I can't tell you just where it is there. My map doesn't show; it doesn't show it anything like fifteen feet at that point.

A. Not so wide as that?

A. No.

Q. What is the width in drift 808 of the Elm Orlu, west of crosscut 813?

Mr. Dickson: The width of your Jersey Blue?

Mr. Folsom: Yes.

A. Something like eight or ten feet although I have no actual measurements on it on the map.

Q. What is the width in drift 1019 Black Rock westerly from there.

A. 1019 is the Deadwood drift.

Q. What is the width of that?

A. Of the Deadwood vein?

Q. Yes, at that point.

A. The first part of the drift is not shown at all. The first

1276 part of the drift isn't in the vein. I have it represented as something like the width of the drift.

Q. Width of the drift?

A. Yes, something like that; probably a little more than the width of the drift. I have only marked it for a short distance on that drift.

Q. What is the width in crosscut 1019 of the Black Rock, on what we call the Jersey Blue?

A. I have it represented as approximately the width of the drift; at least I have not extended it beyond that, because I had nothing to show there.

Q. What is the width on the Black Rock tunnel level immediately west of the cross cut?

A. I have no accurate measurement, but my map here suggests that it is as much as the width of the drift.

Q. How is it easterly from that point, does it continue about a uniform width?

A. It is somewhat narrower, according to my map, east of there for a distance, but as I indicated yesterday, I have not attempted to put down definite dimensions in precise form.

Q. Where are the stopes in the Jersey Blue with reference to proximity to the intersection or joining with the Rainbow; are they all close to it or are there some of them quite a distance away?

A. Some of them are quite a distance away, as on the 1200 level of the Black Rock and the 1300 Black Rock.

1277 Q. How far away does that stope extend from the point of union or crossing; what is the distance approximately?

A. There might be very much difference of opinion as to just where that point of crossing is, which would make the answer to that question a little uncertain.

Q. Where do you think it is?

A. It is a good ways from the point where the two main branches actually come together. How this intervening portion is to be regarded is a matter probably of some difference of opinion.

Q. Point out on the map how far westerly the stope extends on that level?

A. To the west end claim line. That is a good ways from the main branch of the Elm Orlu.

Q. Will you point out the stopes on this section of the Block model, section 21, the stopes that you refer to?

A. Stopes in there and stopes in there.

Q. On what level?

A. On the 1000 Black Rock there are some stopes—no, that is the 1000 Elm Orlu.

Q. Isn't that what you pointed out as the Creden vein?

A. It is at the junction of the Creden vein and the Black Rock vein.

Q. When you get away from the junction between the Creden and the Black Rock, where are there any large stopes in the

1278 Jersey Blue that are not referable in any way to the Rainbow, that is, where there is no chance for a difference of opinion as to whether or not they belong to the Rainbow so called?

A. I don't know that there are any that are far from the Rainbow lode as interpreted by the plaintiff.

Q. That is what I mean; they are all in that vicinity, are they not?

A. There is a stope here which I suppose would be a good ways from what you indicate; that is represented also on your own model here.

Q. On the 1000?

A. Yes.

Q. Practically beneath the Admiral Dewey, extending to the line of the Admiral Dewey practically; is that correct?

A. Something like that.

Q. 1012 is the working?

A. Yes.

Q. As far as you have observed, the veins of the northwest-southeast class, do you agree with this statement: "The order of the deposi-

tion of minerals (referring to the blue vein) has been much obscured by the faulting which took place along the fissures during the period of mineralization."

A. I have seen only one of the northwest fissures with any care, and should not like to make any generalization on the basis of that one; I should not like to affirm or deny that statement.

1279 Q. Well, you said that the faulting of the Jersey Blue was post-mineral, did you not?

A. I did. I did not mean to imply by that statement that there was no faulting along the Jersey Blue before the mineralization.

Q. Yes, I understand.

A. But the faulting which is now conspicuous is post-mineral.

Q. But it is entirely possible, is it not, that there might have been faulting during the period of mineralization, as suggested by these offers?

A. Quite possible. I think it is quite possible also that there was faulting along both the Black Rock vein and the Elm Orlu vein at the time that they were developed.

Mr. Dickson: At the time that they were created, you mean?

A. At the time the fissures were created, yes. I can hardly conceive of much considerable fissuring being developed without at least a little movement.

Q. Isn't it true that there is some of it going on even now?

A. I think it very possible that there is.

Q. Well, describe the extent of granite alteration between the Jersey Blue and the Rainbow veins in the Dewey tunnel?

A. I can't do it.

Q. Aren't you familiar with that?

A. I have been there but I don't think I can tell you pre-

1280 cisely the extent. Between what parts is it?

Q. Between the Jersey Blue and the Rainbow veins in the Dewey tunnel, as nearly as you can?

A. I have no notes touching on that point on my map, and I shall not attempt to say anything from memory about it. I do have a note—the one note only—of the Dewey tunnel some twenty feet the granite is relatively fresh.

Q. Relatively what?

A. Relatively fresh. That is the only note I have of that.

Q. That is the extent of your recollection?

A. That is the only note I have at that point and I don't remember.

Q. To what extent has granite been altered in crosscut 1004 of Black Rock?

A. That is one of the places that can be picked out where the alteration is not great. Probably also, I may add, places where alteration is slight can be picked out along any of the veins. It is not uniform.

Q. What is the extent of alteration in 402 Black Rock?

A. 402 is a drift without many crosscuts, which would show.

We have just the width of the drift to go on. At crosscut 414 there is considerable alteration where the Jersey Blue crosses.

Q. How about 406?

A. I have no note at that point concerning the degree of alteration. There are surveyor's notes on this map which show
1281 wide alteration, but they are not my notes.

Q. How about the west end of 402 as far as it is opened?

A. I don't think I have been in it. I know I haven't been in it.

Q. Have you noticed the direction and dip of any striations and grooves along any of the veins or walls of this property?

A. I have noticed striations along the walls at numbers of points. I have kept no record of them. In general, they are much more nearly horizontal, they are approximately horizontal in most places, but I have noticed them with flat dip.

Q. Is that the only recollection you have of this?

A. I have not kept specific record of that.

Q. What is the vertical distance from the Clark tunnel to 456?

A. Something like four hundred feet.

Q. Look at drift 456 and state from what vein, in your opinion, the drag quartz has been derived?

A. I should not be able to say.

Q. What is your best opinion?

A. I have no opinion.

Q. How much movement would be required to produce this drag quartz?

A. I have no knowledge. If there were a little vertical movement it might have come down from a slight distance above;
1282 it might have come up from a slight distance below.

Q. Over what area was this one movement to which you refer as having produced both the Jersey Blue and the Rainbow vein—over how large an area was the movement which produced what you call the Black Rock and Elm Orlu veins?

A. I have no knowledge of it beyond the properties immediately involved.

Q. Have extended over the whole district?

A. I have no doubt it extended beyond these two properties.

Q. You said that in the 702 the gouge is in and out of the vein. Is that another reason why you think it is not part of the Jersey Blue?

A. That was the reason—I think that is the reason why it is post-mineral.

Q. Just answer the question?

A. I did not say that I did not think the fault was not a part of the Jersey Blue.

Q. I have some samples which I want you to describe?

A. May I preface what I have to say about the individual specimens by saying that I think the meaning—the individual specimen taken out of their setting in big mines like these, has probably little significance.

Q. You have brought several here, have you not?

1283 A. I have, but I know where they came from and I know what their connection is.

Q. Isn't altered granite altered granite no matter where it comes from?

A. It is.

Q. What is the specimen you have in your hand; how is it marked, describe it?

A. Seems to be marked I-X if I can read the marks.

Q. What is that?

A. It is a specimen of granite.

Q. Is it altered and to what extent?

A. It is not altered hydrothermally in an extensive way.

Q. Would you say it was slightly altered?

A. Probably—possibly. It looks as if it came from some region where surface alteration had affected it somewhat. That is not highly altered.

Q. Take the next sample. What is the label on the one you are now handling?

A. This is 2-X.

Q. What is that?

A. It is a partially altered granite.

Q. To what extent would you call it altered?

A. That is a very hard question to answer.

Q. Is it slightly or very much; you have used those words quite often?

1284 A. I should say semi-altered; partially altered; whether it is 30 per cent or 31 or 41 per cent I don't know.

Q. Do you think that is vein?

A. I should say that it would be impossible to say from a single isolated specimen, without its setting and surroundings, whether it is a part of a vein or not; by itself I should not class it as vein matter; in its surroundings I might.

Q. You used the expression "altered divided by two," what did you mean by that?

A. Semi-altered, referring to the general class, not that it is 50 per cent altered necessarily, but partially altered but not highly so.

Q. How is the sample you have now marked?

A. X-3.

Q. How would you describe that?

A. It is a partially altered granite; not completely altered.

Q. Would you call that vein matter by itself?

A. By itself, no; in its setting, I might. If included within the vein; and I should like to repeat with great emphasis that I should attach no significance whatever to such answers concerning these individual specimens outside of their setting.

Q. That is true of all specimens, is it not?

A. Of this sort, yes.

Q. What is the markings on the one that you now have?

A. 4-X.

1285 Q. And what is that?

A. That also is a partially altered granite, more altered than some of this which I have been handling.

Q. Taken out of its setting, would you regard that as vein?

A. I would not, by itself, regard it as vein; but in the proper surroundings I might include it in a broad lode.

A. It depends on the company it is keeping, I suppose?

A. Much.

Q. What is the marking on the one you now have in your hand?

A. 5-X.

Q. What is that?

A. That is a piece of granite; that is not much altered.

Q. Would you call that vein matter, taken by itself?

A. By itself, no.

Q. Is that what you would call fresh granite?

A. If one must say fresh or altered, this is nearer the fresh than the altered.

Q. What is the specimen you now have in your hand; how is it marked?

A. It is marked 6-X.

Q. What is it?

A. The surfaces have been rubbed to such an extent that it would be very difficult to say, I should think, without breaking it open.

1286 Q. Break it open, so as not to destroy the number?

A. That is thoroughly altered granite, probably somewhat crushed.

Q. Would you consider that vein matter?

A. By itself, no, sir; I would not consider altered granite, apart from all mineralization, vein matter; but associated with mineralization I would readily include it.

Q. If you found that near the northeast corner of the Black Rock claim, would you call that vein matter?

A. It would make no difference where I found it, whether I should call it vein matter or not; if I found it associated with a good deal of quartz or manganese or zinc ore, I should probably include it with the vein.

Q. You are acquainted with that corner; you know the general character of the granite that is found there, do you not?

A. Yes. If I found it in this zone associated with numerous small stringers of quartz and manganese and vein, I should include it.

Redirect examination.

By Mr. Dickson:

Q. There is one place in your cross examination this afternoon where I am not certain whether it was 456 drift on Exhibit 67 that you referred to or whether it was 702 drift; when speaking with reference to one or the other of those two places—I think it was the 702 drift—you stated in response to a question propounded

1287 to you by Mr. Folsom that you had not said that the fault there found was not the Jersey Blue fault; what did you mean by the Jersey Blue fault in that connection?

A. I should have said the Black Rock fault.

Q. A post-mineral fault?

A. Yes, a post-mineral fault.

Q. I will ask you if you have been through the workings shown upon Exhibit 65 within the limits of the Elm Orlu claim, extending in a very irregular way from the Clark tunnel, and in which are found the following figures: 22, 84, 90, indicating dip there, I believe; 23, 2-Z, 87, Clark shaft, and then southerly from the Clark shaft, where the most southerly figure we have is 85.

A. I have been through some parts of those workings, but I think not further than this point which there is no way to designate on this map.

Q. That is south of crosscut 84?

A. South of crosscut 84.

Q. Well, if you have not been through the whole of them, I have no further question on it. Is there anything in the Clark tunnel from its mouth to the southerly end of the main portion of the tunnel which corresponds in your judgment with the Pyle branch of the vein as shown at depth in the mine?

A. There is nothing there which I should venture to correlate with the Pyle vein. That might represent my inability and nothing else.

1288 The Court: Perhaps your lack of imagination?

A. My imagination does not work so well as to connect anything that I see below on the Pyle vein with anything here definitely.

By Mr. Dickson:

Q. Does difference in size, width, and extent or magnitude of ore bodies in one vein as compared with another throw, in your judgment as a geologist, any light whatever as to the respective ages of the two?

A. Not in a particularly definite way. A vein of a given age may be large at one point and small at another point.

Q. And two veins created at the same time?

A. One might be large and one might be smaller; they would hardly be likely to be of the same size.

Q. I omitted to ask you on direct this morning if you had made any effort to determine where the south boundary wall of the Elm Orlu vein crosses the south side line of the Black Rock. I will ask you now if you have done so?

A. I have.

Q. And where do you say that it is your opinion as to where that south boundary is found; how far easterly of the southwest corner of the Black Rock claim?

A. 301 feet; that is, 36 or 37 feet west of the east line of trench E.

Q. As shown on plaintiff's map, do you mean?

A. It is marked trench E on Defendant's Exhibit 64.

1289 Q. How far west of the east end of that?

A. At least 36 feet; 36 or 37 feet. That is one of the cases where a precise line is hard to draw.

Q. From what observations made by you do you fix that as the southeasterly boundary wall of the Elm Orlu vein?

A. This is one of the cases, I might say, where the east boundary wall is a bit vague. There is a strong belt of quartz running through which everybody would include in the lode. There is a belt of altered granite east from that, so completely altered that we would agree that it should go with the lode. On to the east there are tiny stringers of quartz and some staining with iron oxides and a little manganese, and the eastern border is not sharply marked, but 35 feet west of the east end, and far west of that which the witnesses for the plaintiff include in the lode, I secured this specimen of what we call——

Q. How is that designated or marked?

A. It is marked "Unaltered but weathered granite, south wall of granite 35 feet west of east end," and might I explain, your honor, one point. It is marked unaltered granite. You will see that it is very rotten granite, and might easily be broken to pieces. It is what in mining language is called fresh granite, because the sulphide and the micas have not been altered into other things. That is the alteration that comes with the surface weatherings; so that this is

1290 weathered granite, but not altered granite in the sense in which that term is used.

Q. Not altered by vein interference?

A. Not altered by vein interference. One of my colleagues has used the term pepper and salt. This is pepper and salt granite, that is, the black mica still shows, indicating the absence of hydrothermal alteration which characterizes what we know as altered granite.

Q. You were asked on cross examination about the Pyle vein, where you found it near the east end line of the Elm Orlu. How far beneath the surface was that?

A. That was several hundred feet down, I have forgotten what level it was; probably 800 feet down or something like that.

Q. Calling your attention to the model, glass model, exhibit 104, if I remember it, and to the delineation thereon of the Jersey Blue vein as called by the other side, southerly on one sheet, northerly or southeasterly of the Black Rock fault and northwesterly therefrom. I will ask you if one might expect such striking differences in a vein as there represented, both representing the downward course of the same vein, one on the north of the Black Rock and the other south?

A. I should not expect the same vein to behave in that way. On the one side we have a fairly regular, definite, well behaved vein. This vein appears to be a sadly broken vein, acrobatic. Veins

1291 are not likely to behave in that way. I would not say that it was impossible, but I would say that it is extremely improbable.

Q. I think you were asked on cross examination of the absence of faulting in the Jersey Blue vein from its westerly extremity as shown upon defendant's exhibit 64 to near the co-ordinate line 25 shown

upon this same exhibit. I think you said you found no measure of faulting there of the vein?

A. I have no record of any notable faulting across here.

Q. In the same section where faulting—what faulting have you found in the Elm Orlu vein; that is between the same points easterly and westerly—major faultings?

A. I don't think I could add anything to what is shown on this map. This shows a fault at this point.

Mr. Folsom: Between 21 and 23?

A. Between co-ordinate 21 and 23.

Mr. Dickson: Do you have a branch of the Black Rock fault passing through there?

A. Yes, sir.

The Court What do you mean, causing the fault?

Mr. Folsom: Causing the cross fault?

Mr. Dickson: I will try to make that more definite: In that immediate vicinity where you say you found that fault is the
1292 Black Rock fault or branch, as it courses, within the southern boundary of that vein?

A. I so understand it.

Recross-examination.

By Mr. Folsom:

Q. I call your attention to the other end of what we call the Rainbow and what you call the Black Rock vein and ask if there is any faulting—what faulting is there to be observed in that section?

A. The Deadwood fault is the conspicuous thing there.

Q. There are no other faults?

A. I presume there are other little faults. There are many little slips which offset a little bit all through that country, but that is a considerable one.

Q. Now, with reference to the Pyle vein, I understood you to say this morning in trying to fix the points upon which we agreed that the Pyle strand of the Rainbow extended through the Elm Orlu to the point somewhere near the east end line. Now, with reference to the surface you are unable to project that vein nearer the surface than did the plaintiff's witnesses?

A. I haven't seen anything that I could recognize as the Pyle vein as high as the plaintiff's witnesses have placed it.

Q. But you do place it within the lines of the Elm Orlu claim, do you not?

A. At a deep level.

1293 Q. At what level?

A. I should have to refer to my notes on that.

Q. Perhaps you can tell on the model?

A. I should prefer my notes on that point as I am not very familiar with the model. Black Rock 700——

Q. As far as you know the vein terminates there on its upward course?

A. No, I wouldn't say that. It is distinctly shown there. It is shown near the east end of the Elm Orlu claim, at the Black Rock 800 level. It is not shown so far as I know down near the east end line on the 700 level but up the raise from the 700 level the Pyle vein is visible here and there. I did not go through that raise at the time it was making and when I went through it was so far timbered that I could only see the wall here and there.

Mr. Dickson: We asked him nothing about it on direct examination.

Mr. Folsom: You asked him on re-direct about whether he could identify anything across the surface.

Mr. Dickson: Go ahead.

Mr. Folsom: That is all.

Witness excused.

1296 *Testimony of Albert Burch for Defendant.*

ALBERT BURCH, called as a witness on behalf of the defendant, being first duly sworn, testified as follows:

Direct examination.

By Mr. Dickson:

Q. Give your name, Mr. Burch, and your age?

A. Albert Burch, aged forty-nine—nearly forty-nine.

Q. What is your residence?

A. Berkeley, California.

Q. Have you studied the profession of geology in any institution of learning?

A. I have not.

Q. Have you studied mining engineering in any institution of learning?

A. I have not.

Q. What is your business, Mr. Burch?

A. My business is a mining engineer.

Q. How long have you been following that business?

A. My first experience in that line was in March, 1888.

Q. How continuously since then?

A. From that time continuously since that time up to the present day.

Q. Give us the names, if there be any, of some of the principal mines, large mines in the various states or territories of 1297
this western country with which you have been connected as superintendent or having direction of the development work?

A. Well, I commenced first as underground surveyor and assistant foreman for the Bullion, Beck and Champion mine operated in Utah.

Q. Was that a large mine?
A. Large mine, yes.
Q. How long were you connected with that mine?
A. About five years. I finally became superintendent of that mine and then from there went to Oregon for a short time while during the absence of the regular manager I acted as manager for some eight or nine months of a small gold mine. That was in 1906 and 1907. In March or April 1907, I went to the Bunker Hill and Sullivan mine in the Coeur d'Alenes as mine superintendent. I was superintendent of the Bunker Hill and Sullivan for five years, up until the early part of 1912 when I became manager of the Bunker Hill and Sullivan. I was manager of it until the early part of 1916 and for the following eight years was consulting mining engineer, a consulting capacity to the Bunker Hill and Sullivan.
Q. As a consulting engineer?
A. No, chiefly in connection with their litigation. Early in 1917——
Q. Before you leave that, the Bunker Hill and Sullivan mine that you refer to is that a large or a small property?
A. It is a large property.
Q. Extensively developed?
A. Extensively developed, yes. At the time that I was in charge of the property we were only producing about eight hundred tons of ore a day, eight or nine hundred tons of ore a day, but it has grown now to a production of 3,000 or 4,000 tons of ore a day. At a short moment ago, for the recording, eight years I was almost constantly employed in a consulting capacity to the same company until the litigation was completed by a compromise in 1923, a compromise which was initiated and largely brought about by the efforts of Mr. Hoover and myself. That connection as engineering with the Bunker Hill and Sullivan. During that same period I examined a great many mines and mining properties for interesting investors in all of the mining states of the west except Colorado and in Mexico and Alaska. During the year 1911 I was consulting engineer for the Guggenheim Consolidated Mines Company, Limited, Canada.
Q. Is that an important mine, largely developed?
A. It is one of the large gold mines of the United States. And during the same period between the operation of the Guggenheim Consolidated Gold Mines in California, Canada Creek, of which I was still in charge.
Q. In what capacity are you in charge?
A. I am the American representative of Sir Edmund Walker, [illegible] Company of London, who are the managers of some forty or fifty companies including this one. During the years 1911 and 1912 I was general manager of the Guggenheim Consolidated Mines Company. The same one of which I had been consulting engineer in 1911. After the company obtained the control of the Yukon Consolidated in the same way I became vice-president and general manager of that one. Since the time of the sale I have been consulting engineer for that Guggenheim Consolidated up to the date of

be seen driven from the Daylight tunnel to the surface at the place which was determined by survey to be the discovery point as marked [illegible] to the patent to the claim. This mine has passed, through its entire extent, through old workings that have been filled either by caving or by such filling as is done in the process of mining, so that there was originally an excavation there either in the form of a shaft or in the form of a slope in unquestionable; and this, of itself, would indicate that there was at that point a vein on the surface. It is probable that it was a slope beyond us the tunnel level mentioned below.

Q. How far below?

A. About eighteen or twenty feet. We are now found unmistakable steps filling material that—well, in the little vein [illegible] crosscut tunnel as constructed—there is filling up to the height of about two feet above the floor and then above that a natural granite, which has evidently caved down into this steps thing. It is probable that it was quite a large steps and in that event its caving would have come from the sides as well as from the top, because you can see the filling for a long distance in the crosscuts from the tunnel; consequently I think it is very likely it was a steps that extended up to the surface. Going downward then from the discovery we pass through an old steps down to the Niagara tunnel level.

Q. Shown on what exhibit?

A. Shown on exhibit 60. Beginning at a point marked [illegible] in pencil on exhibit 60 we find there the lower part—not necessarily the bottom, but the lower part of the same steps, and for the next 100 feet eastward the workings as at present constructed are within the limits of the old steps. From that point to about section 11 as delineated upon defendant's exhibit 60 there is a continuous vein of [illegible] and quartz exposed along the north part of the workings with a gouge along the northern wall. On about section 9 the vein is interrupted by a fault with apparently a very short throw. I changed to be there at the time that work was done and [illegible] it is cluttered up now and difficult to see. I know that that fault gouge was exposed there. It is displaced just a few feet to the north.

Q. Displacing entirely within that vein?

A. No the entire width of the vein, no. But the south wall of the vein is displaced for a few feet to the north. The vein continues up to the face of the workings indicated by my pencil, which is not named, but is indicated by the letter "B" in pencil.

The Witness: Marked by the letter on Section line 10. At the point where the fault was encountered, a diagonal crosscut was driven, which encounters the vein again at a distance of perhaps 15 feet easterly from the point designated as "B." There is no question at all but that that is the same vein, and within a few feet of there a slope is entered going eastward, an old steps which is about 150 feet long on the level. It is quite evident that the vein was found through that steps.

Q. What do you mean by a steps, an excavation from which an ore body was worked out?

A. An excavation from which ore has been worked out. The timbers all indicate it, and it is undoubtedly the case. At the easterly end of the stope we enter a section of ground where for a distance of about 50 feet, or between stations 1118 and 1111 there is a rather definite seam of quartz probably a foot in width with altered granite extending over the remainder of the width of the drift on the north side, and rather fresh granite on the south side. This quartz is followed in the drift to station 1111, where it departs from the southerly side of the drift going easterly, and since this
1302 map was prepared, has been driven upon for a short distance easterly, just how far I don't know; I haven't seen that drift since it was advanced just a few feet. From 1111 to 1110 there is no definite fracture within the drift itself; it is in thoroughly altered granite with numerous quartz seams running in all directions, ranging in size from half an inch up to three or four inches in diameter. From station 1110 to 1109 and onward through 1098 and 1093 the drift follows a pretty clean-cut seam, which is perhaps four or five inches wide and has a little gouge, and has a little quartz, ranging from an inch up to in places three or four inches; and from 1098 for a distance of 40 feet easterly there is thoroughly altered granite along the seam, and also in the entire drift. From the last named point for a distance of about 40 feet, which takes it to the cross cut from the mill tunnel, there is only a band of altered granite followed and a gouge seam with comparatively little quartz. Immediately south of 1093 for a distance of about 8 or 10 feet, as shown in the cross cut from the mill tunnel, there is rather fresh granite. Then we get to a seam of quartz. I would rather refer to my notes for the size of these seams; I remember where they are, but I don't remember their width. The first seam of quartz is three inches wide with a little gouge along it; the next one is 6 inches wide with no gouge; and the third one is about 3 inches wide with a strong gouge on the south side. Between them, in the space between these quartz seams there are so many little ones, evidently following joint
1303 planes of the granite in every conceivable direction, that it would be impossible to enumerate them without taking a great deal more time than the subject would justify. The fact of the matter is that it is all vein matter across for that distance.

Q. Have you undertaken to trace that easterly from the mill tunnel?

A. Yes, I will get to that in a minute. It compares almost exactly, or is very similar to that which is disclosed by Plaintiff's Exhibit 4. On that exhibit there are cross cuts under the west end line of the Elm Orlu, in which are exposed almost the identical same conditions as I have described on Defendant's Exhibit 66 as being found in the cross cut from the mill tunnel of the Black Rock claims. The only differences are these: in the cross cut under the west end line of the Elm Orlu we have the heavy post-mineral gouge of the Black Rock fault with two little parallel gouges on them, and the rock there is unoxidized, while in the cross cut from the mill tunnel it is oxidized.

Q. In the cross cut near the west end line of the Elm Orlu how do the quartz seams there compare in size with those you have d

scribed as having encountered in the cross cut from the mill tunnel, and how does the granite between the seams in the cross cut near the Elm Orlu west end line compare with the granite between the seams in the crosscut from the mill tunnel?

A. It is just about the same; there is very little difference
1304 between them. The only difference is the amount of oxidation, and the fact that there is the gouge of the Black Rock fault crossing the end line of the Elm Orlu.

Q. Is the size of the seams comparable in the two cases?

A. Yes; I don't remember, and my notes don't show it there, cutting any seams larger than an inch or two on the west end line of the Elm Orlu, and I find one here that I have noted as six inches in the cross cut from the mill tunnel; but the character of the rock is almost exactly the same; it is thoroughly altered and mineralized, and has many little cross fractures containing quartz.

Eastward from the mill tunnel as shown on Defendant's Exhibit 66, on the surface there was an excavation made for an addition to the mill. That excavation was quite fresh when I first went onto the ground in August, and in the sides of that excavation, almost exactly on the east end line of the Black Rock claim, I noted five quite prominent seams of quartz striking easterly and westerly, a little north of west and a little south of east, and between those seams of quartz the rock had the same appearance of thoroughly altered granite that it has in the cross cut from the mill tunnel just westerly, consequently I should say that on the surface the Black Rock vein unquestionably, or a branch of it, crosses the eastern end line of the claim. The mill tunnel and the Niagara tunnel are only
1305 just a few feet below the surface throughout their whole extent; I suppose that the greatest depth is beneath the discovery, which I have described. There it is nearly one hundred feet below the surface, and gradually approaches the surface as you go eastward.

Now, taking up the question of the vein west from the discovery, I think I would prefer to describe it from the west end eastward I have not been able to see this vein exactly on the surface; the surface there is all more or less covered with wash; but I have seen it in what is called the gulch tunnel on Defendant's Exhibit 64, and I have also seen it in the crosscuts from the west drift from the Dewey tunnel, as shown on Defendant's Exhibit 65. In this latter place, referring to the cross cut No. 6 and cross cut No. 2 from the west drift from the Dewey tunnel, I found a branch of the vein—I found a broad vein perhaps 8 or 10 feet of solid ore, quartz, zinc and manganese, in the face of crosscut No. 6, with a heavy gouge nearly vertical, about four or five inches of gouge on the north wall. Then proceeding from the face of the cross cut No. 6 back to the main drift, I passed through a number of stringers of quartz, some of them quite large. One of them, as I remember, is 14 to 16 inches in that crosscut and others smaller, having a strike diagonal with reference to the general course of the Black Rock vein, and leading out into the country to the south of the main portion of the vein.

Then the drift itself—I refer now to the west drift from the

1306 Dewey tunnel—there is a fairly continuous quartz seam also with a gouge on its south wall. The material between those two, over a width of about 60 feet, is practically all a part of the Black Rock vein at that point. Going eastward from crosscut No. 6 on the Dewey tunnel, we encounter the main north wall of the Black Rock vein again, at the point where the Dewey tunnel crosses it. There we have five or six feet, maybe more, of quartz with a heavy gouge on the north wall. There is at least six feet there; my map would scale a little more than that, but I am not sure that I have exactly definite lines on that point. At this point where the Dewey cross cut tunnel intersects the north wall of the vein, there is a short raise, my recollection is about 20 feet, from the Black Rock tunnel, and the drift along the Black Rock vein from that tunnel immediately below. Going on eastward along the last named drift toward the main Black Rock cross cut tunnel, we follow a vein which is wider than the drift; how wide it is I don't know. Along the north wall of it there is a strong post-mineral gouge, ranging from two inches up to sometimes six or eight inches, in which we find embedded nodules and particles of zinc ore, quartz, manganese, as are shown in these two specimens which I have in my hands, one of which is marked B-1 and the other B-2. These samples of gouge were taken from the west drift on the Black Rock vein from the Black Rock tunnel at a point about 90 feet west of the top of the raise which comes up from the 400 foot level of the Black
1307 Rock. The one marked B-1, as your honor will observe, this gouge, which was soft and plastic when I took it out, and embedded in it was this nodule, which, being broken open, exposes on the inside granite and zinc ore surrounding the granite. The mtaerial outside of it is the soft plastic gouge, which was wet enough yesterday, though I took it out on Sunday, but it is getting dry now. The other one, B-2, has gouge on the side where I hold my pointer, and gouge on the opposite side. Some of the gouge has fallen off of the upper side as I hold it now, because I could not keep it all on there after the drying; and in between is crushed zinc ore, quartz, crushed granite, and I think a little manganese, though I cannot detect that now. Continuing eastward from the foot of the raise from the Black Rock tunnel level up to the Dewey tunnel level, past the point where these specimens of gouge were taken, as we approach the Black Rock tunnel cross cut itself we reach a point where apparently there has been a stope in the vein. There is a chute there and there are stope timbers, and it looks like a filled stope overhead.

Q. Where is that?

A. Well, a portion of it is west of the Black Rock cross cut tunnel and a portion of it is east of the same tunnel, extending to a point about 30 feet east of the Black Rock cross cut, where a branch through country rock has been driven around the end of the stope and the course along the vein is resumed again. Going
1308 eastward from the point where the vein is encountered on the drift at the east end of the stope just referred to, at a distance of about 40 or 50 feet, the gouge which has been quite prominent along the north wall of the vein westerly therefrom, divides into two

strands first, and then as you go eastward here, the strands divide again until in the region of 250 east of section 25, as indicated on Defendant's Exhibit 65, we find a large number of gouge seams, which are branches from the main one which have come from the west. The strongest one, however, of these gouges is at this point, namely near crosscut No. 15—there it has departed southerly from the vein proper. It is followed—that is to say, the gouge is followed quite definitely by a drift from which cross cuts Nos. 15, 16, 18 and 19 have been driven, and finally the last strand of the gouge at a point which I will mark in pencil "A" with an arrow, joins a strand of the main Black Rock fault.

Q. Now, right there, let me ask you a question. That drift from near station 831 to station 863 and down to the point that you have just marked with the arrow and the letter A, by whom was that done and for whom, if you know?

A. I have been informed that it was done for the Elm Orlu Company.

Mr. Gray: I will concede that that is true, judge; that after you drove the others up the other way, we drove down on this heavy gouge.

1309 Mr. Dickson: That is admitted then.

The Witness: I digressed a little from my tracing of the vein to show what this drift follows, and later I will come back to that point. The vein itself continues on eastward or a little north of eastward through the drift in which stations 775 and 787 are found, and also in the country immediately adjoining to the south there is rather a definite strong band of quartz which is followed by a drift from station 775 nearly to 786. But that is not all of the vein. The vein matter immediately to the south of it is made up of thoroughly altered granite, and also contains many seams of quartz. In this connection, at a point just south of 776 I saw a band of zinc ore perhaps 9 inches wide in the upper part of the drift, just as I was facing it, without any gouge or any separation from anything to indicate why the ground below it should be different. The ground immediately underneath that zinc ore was nothing but altered granite; there was no line of separation in between; showing that the transition from altered granite into commercial ore is quite likely to be very sudden within the limits of the vein. In this same connection on the 1100 foot level of the Elm Orlu mine there is a crosscut about 70 feet in length, 40 feet of which is through altered granite, with scarcely any seams of quartz in it, and yet, overhead, above that cross cut, just above the top of your head, not more than half a set above the tunnel, they are stoping solid zinc ore right across, without

1310 any line of separation or of slipping or any faulting or anything of that sort to separate one from the other.

Proceeding then northeasterly from 786 and beyond 787, the heavy band of quartz which at 786 is five or six feet wide, terminates against a northwest-southeast slip, very much as is shown on Plaintiff's Exhibit No. 8. The position of the seam on Plaintiff's Exhibit 8 is probably a little too far to the east, but the seam is there

and the cutting off is about as they have shown it. Evidently the vein is displaced slightly to the north by a series of slips having a northwest-southeast strike.

Q. Cutting off the so-called Jersey Blue vein?

A. Cutting off the Black Rock vein, the so-called Jersey Blue. From station 786 through the two lines of workings running easterly toward the discovery for a distance of about 130 feet the entire drift follows what can be said to be a definite fissure. Both drifts are within the limits of the vein, the walls of the vein being, the southern one further south than the southernmost of the two drifts, the northern one being further north than the northernmost of the two drifts, the country in between being of that character of vein that has been called altered granite with seams of quartz. Beyond a point about 40 feet east of cross cut No. 7 the northwest one of these two drives encounters solid manganese and quartz ore which is evidently the beginning of the Niagara branch of the Black Rock vein; but immediately south of that particular branch we have the same vein material which has been described to the west of
1311 cross cut 7 through to the discovery shaft, except that as we approach the discovery point the seams of quartz become heavier, going up to perhaps a foot in width, and there is more manganese exposed.

Now, with reference to the area right around where the figures 25 are, and where I am holding my pointer, the evidence is certain of a stope underneath, extending from the east as far west as the discovery shaft. It is also certain for a distance of 15 feet west of that in cross cut No. 20. The ground on the sides of both has settled down onto the filling. I am very doubtful whether, in a region where there are so many gouges as there are here, if the territory right around the figure 21 is really in place; it may have come from the side or from above, but there has certainly been a good deal of settling down onto an old stope there; but nevertheless, whether it is in place or not, it is distinctly vein matter, if not ore.

That I believe completes the tracing of the vein from the west end line to the discovery and from the discovery to the east end line of the Black Rock claim.

By the Court: Well, at that point, do you have the Black Rock vein passing through the Rainbow or the Rainbow passing through the Black Rock?

A. Neither one; they join.

By Mr. Dickson: They merge, you mean?

A. Yes, they merge.

By the Court: Then why do you take the Black Rock
1312 vein to the east southerly, instead of assigning it to the Niagara vein?

A. We might as well; it is all one vein. In order not to get beyond the point at issue I have followed one branch; I could just as well have followed the other branch, which does not go across the end line of the claim. They are both part of the same lode.

By Mr. Dickson: As I understand, what the court wishes you to speak of is whether the branch crossing over the northerly side line

of the Black Rock claim, whether you regard that as a branch of the Rainbow lode, so called by the other side, or a branch going out in that direction of the Black Rock lode?

A. Both. They are two branches of the same vein. In that connection, referring to plaintiff's exhibit 4 there is a section through from what is marked here "machine shop" to trench "D" in which the Rainbow lode is shown to be very narrow. Eastward from the machine shop it branches and widens; westward from trench "D" it also branches and widens. If the Black Rock branch, called by them the Jersey Blue, has been shown correctly upon this exhibit 4, it would have shown less pronounced narrowness to the vein through the section where it appears now in this exhibit No. 4. Some of the lower level maps—the same thing is shown on the model. You go out to the east and you have the widening of the vein in that direction and you go to the west and you have the widening of the lode in that direction and in between a narrow space which is
1313 rather difficult to explain when you are not a geologist. Apparently there has been some stretching out there on account of the faulting along the Black Rock fault; that is the way it would appear to a layman, but possibly it is simply a converging of the fissure at one point and then a diverging again. But these points are shown by actual stoping and actual work on the vein both east and west from that narrow section. It is also shown, though not quite so pronounced, upon defendant's exhibit 78, and yet you can see the vein coming in like the neck of an hour glass and spreading out both ways. On defendant's exhibit 74 a similar condition is shown, the widening both east and west from this narrow point. Referring again to the fault from which the gouge was taken that I just gave you and looking at defendant's exhibit 65 and station 831, as explained before, the fault going eastward departs from the vein and in the drift from which cross cuts 15, 16, 18 and 19 have been run the fault is well exposed with numerous branches or strands leading off northeast and easterly from it. In some places in that drift there are two strands of the fault exposed within the width of the drift itself and when they are we find a condition something as I will sketch. Assuming one strand on one side of the drift and another strand on the other side we find between these strands irregular, diagonal bunches of quartz, some of them three or more inches in diameter, some of them not more than half an inch,
1314 but crushed and broken.

Q. The entire mass between the two crushed?

A. Entirely crushed, yes. Going up against the southernmost strand as exposed in the drift to which I referred, we find large seams of quartz exposed in cross cuts 15, 16, 18 and 19, which have a course about as indicated by defendant's exhibit 65. When these pass into the side of the drift and encounter the gouge of the fault their edges are chambered off so that the seams of quartz have an appearance about as I sketched them there, showing that the fault is here—showing that the fault is later at least than those seams of quartz and showing also that there was no deposition of quartz par-

allel with the gouge itself, and therefore, no mineralization of any nature in that immediate section after the gouges were formed.

(Whereupon the diagram was marked Defendant's Exhibit 114, admitted.)

Q. Proceed?

A. Going now to the question of whether the Black Rock vein, which the plaintiffs have called the Jersey Blue, passes through and displaces the Elm Orlu-Black Rock vein, which they have called the Rainbow, I have observed on the Black Rock tunnel level as exhibited on defendant's exhibit 65 the following facts:

Q. Before you proceed, I will ask you if you have made a
1315 careful examination of all the places, any of the witnesses on behalf of the plaintiffs have referred to as places where there was found the most satisfactory evidence of such faulting of the Rainbow lode by the Jersey Blue lode?

A. I have examined all of them that were in a condition, after I reached here in August, so that I could examine them. Some of them were not in such condition that I could make an examination been stoped out or stoped and filled so I couldn't see the spots.

Q. I will have you take up each one of them and state to the court what examination you were able to make and what you did observe.

A. At the point on defendant's exhibit 65 to which the arrow to the large letter "A" is pointed I saw the southernmost strand of the gouges which have been followed by the drift just described turning around and uniting with the heavy gouge of one strand of the Black Rock fault, where I hold my pointer.

Q. In what direction does it turn, Mr. Burch?

A. It turns to the northeast and unites with that gouge. Immediately south of the point of union we find exposed in the crosscut leading to the south four or five feet of black manganese-stained quartz, manganese ore, and we come to what appears to be another strand of the Black Rock fault which turns southerly as it proceeds
to the southwest across the crosscut and appears to die out at
1316 the side of the drift near a survey station here that does not seem to have any number. I will mark it in pencil "X." At a point opposite "X" on the south wall——

Q. That might become rubbed off or obliterated. How far is that from the westerly figures 25?

A. The westerly figure "5" in "25" is about a quarter of an inch south of the station marked "X."

Q. As measured on the map?

A. As measured on the map. Immediately south of the station marked "X" on the——

Mr. Gray: May I indicate to you that that is the same station as 1072 on plaintiff's exhibit 8?

A. It is the same station as 1072 on plaintiff's exhibit 8. Immediately south of station 1072 on plaintiff's exhibit 8 on the south wall of the working No. 25 a weak gouge running southeaster

begins. It apparently does not reach the lower strand of the Black Rock fault which I have just described which dies out in the roof. The weak gouge is followed from there easterly in working No. 25, a little tiny branch of it departs to the east and also to the south, to where it reaches the face, the south face of working No. 25—southeasterly face—we have left a vertical gouge say about a quarter of an inch in width, and there is a little altered granite, in fact the working 25 is nearly all in altered granite that might properly perhaps be included in the broad lode, but the seam itself becomes about a quarter of an inch thick, I judge, at the southeast face of 25.

1317 Q. May I ask you right there what else is in that working besides the gouge and the altered granite?

A. I was just going to say. There is no evidence of any mineralization in the way of quartz following with the gouge, but in the sides of the working you can see occasionally a little seam of quartz running I think up to about an inch and ranging down to a quarter of an inch, coming up the sides and terminating against the little gouge seam which the drift follows. Going westerly in the same working, No. 25, from the point marked "X" on defendant's exhibit 65, and the station 1072 on plaintiff's exhibit 8, the drift 25 westerly is in somewhat altered granite and has a few little quartz seams in it until it encounters a strand of the Black Rock fault at the point where the drift turns more towards the southwest. Just beyond and to the northwest of that strand of the Black Rock fault we see again the same mass of quartz that was exposed just south of "A," but in drift 25 instead of having so much of the black manganese stain, it is a lighter colored quartz and—it is undoubtedly the same thing. Taking the conditions as I have described them and as I saw them on the ground I can not bring myself to see any correlation whatever between the little seam followed by working No. 25 and the Black Rock vein as opened up by workings 22, and 1 and 7 as shown on plaintiff's exhibit 5.

Q. Before you leave that, Mr. Burch, one question I would like to ask you: How do the quartz seams you found in the
1318 sides of the 25 drift compare in size with the quartz that you have in what you call the Black Rock vein, which you have just referred to?

A. There are none in 25 that are anything like as wide as the widest ones that are found in the area I have referred to—in the area in reference to which the question is directed, but there are some that are as large as the smallest ones. They are little tiny things, half an inch and from that up probably to an inch—yes, up to two inches. The gouge cuts on drive No. 25, original quartz seams in fresh granite from one-half inch to two inches. I find I was mistaken in saying that was altered granite. That was my recollection, instead of referring to my notes. In 25, running southeasterly from station 1072 as shown upon plaintiff's exhibit 8——

Q. There is no altered granite?

A. No, not—my notes don't say so; says "fresh." My recollection was that it was altered. In drift No. 456 on the 450 level of the Black Rock mine——

Q. Defendant's exhibit what?

A. Defendant's exhibit 67—we find a gouge seam followed by the drift, a seam having a northerly dip, and accompanied, so far as I was able to see, by no evidences whatever of mineralization. This seam is a stronger one than the one exposed in the drift 25 on the Black Rock tunnel level.

Q. Seam of what?

1319 A. Gouge. It is a gouge seam that generally is perhaps half or three quarters of an inch thick, but in parts of the gouge up to as much as about an inch and a half or two inches; but it is not accompanied, so far as I was able to detect, and I was there when it was not timbered, by any mineralization in the form of quartz following with it. In fact, I did not see any signs of quartz cut by it until we reached nearly the western face. There there was a wide band of quartz which was cut by that gouge seam before the gouge seam itself turns round to the southwest and united with a strand of the Black Rock fault, as it does in that working. Perhaps I better illustrate that by a sketch. I am sketching now the gouge seam as I saw it which follows the working 456 from the 451 cross cut of the Black Rock mine westerly.

Said sketch was admitted in evidence and marked Defendant's Exhibit 115.

A. (Continuing:) On this sketch, defendant's exhibit 115, the blue represents gouges and the red quartz or mineral and the brown possibly the outlines of the working. That would be as it appears in the *roof* of the drift and not on the floor. In other words, the gouge is near the side of the drift throughout most of its extent in the *roof*, while at the floor it would be nearer perhaps to the center of the drift or maybe the bottom of it.

1320 Q. Due to its southerly dip?

A. Due to its southerly dip. On the 800 level of the Elm Orlu as shown on defendant's exhibit 69, the Black Rock vein may be traced entirely from workings No. 809 through working 808 and the northerly branch of the same working which connects with cross cut 813, traced northerly from the western part at cross cut 809, through working 808 to a point 9 sets west of cross cut 817. In other words, at about section 25 as shown on defendant's exhibit 69. At this point the vein disappears into the south wall of the drift and from that point eastward drift 808 follows the gouge of the fault. In crosscut 817, about twenty feet from the end—from the edge of working 808 we find also another gouge, that being unquestionably one of the strands of the Black Rock fault. Continued easterly in working No. 808 the two appear to unite, at least they get so close together that they can not very well—have to unite, but unfortunately that working has been in a very bad condition since I came here and I have not been able to pick out the exact point of union. They approach within a foot or two of each other in 808, I am sure, and appear to come together, but I don't see the exact point of union.

With reference to working 702 as shown on plaintiff's exhibit 7, the most of that working is readily accessible and it is easy to see what it contains.

Q. Now, accessible, at the present time?

A. Yes, and easy to see what it contains, but the westerly
1321 part of it runs into a stope and that was worked out before I saw the mine and consequently I am not able to describe the conditions with reference to the fault where the drift follows beyond or westward of the raise which is shown as upon drift No. 70, shown upon drift No. 70, but from that raise eastward through the 702 drift, following a narrow vertical fault gouge that is quite strong. There may be from an inch to two inches of gouge and at intervals in the roof I could see fragments of quartz.

Q. Broken?

A. Apparently broken—lying, however, nearly parallel with the gouge itself. I saw quartz there from three inches to six inches in thickness that had a strike for some feet, five or six feet anyway that I could see, substantially parallel with the gouge, but separated a short distance from it. Looking easterly as you come out of the drift and facing the east side of crosscut 701, you can see the same gouge disappearing into the wall and also see north of it separated from the gouge by a foot or so of granite a quartz seam that is six inches thick.

Q. North of it or south of it?

A. The quartz is north of the gouge.

Q. North of the gouge?

A. Yes.

Q. Is there any gouge accompanying that granite or is it a continuous seam of quartz?

A. A seam of quartz on top.

1322 Q. No gouge in connection with it?

A. No.

Q. Did you take the dip of that gouge seam in 456; you said it had a northerly dip.

A. It has a southerly dip, but I am quite sure I didn't take the exact dip. It was exposed in the roof, but you couldn't see it on the floor. You could see enough of it on the roof to determine it had a southerly dip—no, I didn't. Referring to defendant's exhibit 76 and to a point near station 899, I find at this point a fault gouge about across the drift in about the position claimed by the plaintiff's engineers for the southeastern extension of the Jersey Blue vein. There has been stoping above this point and while I got the dip of the gouge and approximately the strike of it I was unable to see whether at that point it was accompanied by any mineralization or not.

Q. Why?

A. Because it had been obscured by stoping. But in cross cut—the next one to the east here doesn't seem to be numbered on this map, but has a figure near it which says "86 degrees."

Q. Near what section line is that?

A. Near section line 28.

Q. Just a little east of it?

A. Yes, just a little east of it. I find from correlation across the space what must be I think the same gouge. It is a rather gouge about two inches thick, black, shows movement, considerable
1921 movement and is accompanied by no mineralization whatever, no quartz, to speak that is slightly altered. Going an eastward from that point to the eastern end of the working which is intended to follow the Fyfe strand of the vein and in the same adit, only some cut to the south from this working I find a similar gouge disappearing into the wall, what appears to be the same thing. It is also not accompanied by any mineralization, going with the gouge, but separated from it some three or four feet is a little vein—pretty good vein six or eight inches wide of zinc ore. So two apparently having no connection, one with the other. Working 1001 shown on the drift, defendant's exhibit 78, is supposed to cross the southeastern extension of the Jersey Blue vein by the plaintiff's engineers, but the working has been caved and closed since I came here and I have not been able to either say that it is or is not there. I have not been able to examine it.

It is also true that the raise at the end of it marked 925, shown on Defendant's Exhibit 78, that the cross cut 925 is closed in to small by caving, and I have not been able to see the point referred to there. I have not been able to make any examination at that point.

Referring to Plaintiff's Exhibit No. 55, the Jersey Blue vein is shown upon this exhibit as a comparatively straight line line, passing through the 1000 stope from their western cut to a point just east of station 904. The same all four of the stops is shown upon
1922 Defendant's Exhibit No. 90, and it will be observed that on Defendant's Exhibit No. 90 a raise is shown where section D crosses through the stope. The position of the same raise is shown just north of where the letter "W" is put on to ground on Plaintiff's Exhibit No. 55. It will be observed that the distance from the foot of the raise to the blue line shown on Plaintiff's Exhibit No. 55 is something more than 20 feet. That raise is the same one that is shown on the model, Defendant's Exhibit 101 at the point where I now hold my pointer.

Q. Designate that in some way?

A. It is the foot of what is called the Black Rock raise on Defendant's Exhibit 101, which has been variously known as the Cliff raise and the west raise. The hanging wall of the Black Rock vein I exposed in that raise on the north side of it. It is a continuous gouge fissure which has been followed continuously upward from that point to my knowledge to the 1200 foot level of the Elm Orlu. I have not been through the raise between the 1200 of the Elm Orlu and the 800 of the Black Rock, and I have simply the testimony of the other witnesses as to what it follows between those points, but from the 800 of the Black Rock up to the Black Rock tunnel it follows the same gouge on the north wall the same vein, and the vein which is known to us as the Black Rock vein, and which has been called the Jersey Blue vein. The top of the raise is shown on Defendant's Ex-

designated as the Jersey Blue vein, to the 1200 foot level of the
1327 Elm Orlu mine. This drift that is dotted, because it is on the second floor of the stope, follows the hanging wall of the vein continuously from the raise eastward and from the stope westward, and the two faces were, at the time of my visit, still about 10 feet apart. It has been connected since. It was connected the next day, but I have not seen it. That is the hanging wall of the Black Rock vein, the same vein which the system of raises shown on Defendant's Exhibit 101 follows upward to I believe, the Black Rock tunnel. I looked across the roof of the stope which is shown in dotted lines south and east from the arrow for evidence of any vein going through that body of ore, which is a solid body of zinc ore 50 or 60 feet wide. Along that line, or having a course similar to the blue line shown on Plaintiff's Exhibit No. 22.

Q. There are two blue lines; you mean the one in blue going through the red?

A. Going through the 1304 stope. I found at one point six sets or about 30 feet from the drift which I have described as going westerly and connecting with the Black Rock raise, a seam of gouge two inches wide. That gouge stands nearly vertical, and has a strike slightly north of east and south of west, or as shown upon Defendant's Exhibit No. 80, about as I hold my pointer, instead of south of east and north of west as I hold my pointer on Plaintiff's Exhibit
22. There is no evidence that I can see of a vein other than
1328 the main Black Rock vein anywhere in that stope of solid zinc ore.

On the 1400 foot level of the Black Rock mine, as shown on Plaintiff's Exhibit 24, there is a similar blue line. The roof of the level—the level having been cut out of the sill floor of the stope—is pretty well lagged from about station 247 westward, but in the extreme westward end of the stope I find strong gouge on the north wall of the ore body, but I fail to find anything in the nature of a vein immediately south of that, that could be differentiated in any way from the vein on which those workings had been constructed. In the cross cut 1414 and cross cut 1410 I saw them very much as shown upon Defendant's Exhibit 82; the transverse structure of the seam of ore and gouge leading out to the southeast from the main ore body, and is really a lean part of the main ore body. But I fail to find anything in the nature of a vein running as my pointer lies, which is substantially the same as the blue line upon Plaintiff's Exhibit 24. I could not differentiate between the zinc ore as I see it in spots up between the lagging in the top of this broad ore body—differentiate between different points of it and say that part of it belongs to one vein and part of it belongs to another. In cross cut No. 1416 at a distance of 40 feet from the edge of the main east and west drive 1404, there is a gouge crossing the drift, having a strike of north 82 degrees east,
and standing vertical. That gouge is in about the same posi-
1329 tion in the cross cut as the so-called Jersey Blue vein shown in blue on Plaintiff's Exhibit 24, which, as shown on that exhibit, has a strike of about south 73 degrees east, being a difference of 21 degrees from the true strike as shown in the ground. That is

rather a narrow gouge, about an inch, as I remember it, and between that point where the gouge crosses and the southern edge of the vein there are numerous quartz seams crossing the drift in an east and west direction, part, no doubt, of the main Black Rock vein, but it is not commercial ore and could not be stoped. I am forced to the belief that there is no vein of the nature of the Jersey Blue crossing the working numbered 1416 in the position shown on Plaintiff's Exhibit 24.

Q. Is this cross cut you have referred to, these cross cuts, either one of them, 1416 or 1406, open to observation?

A. 1416 is open but 1406 is not.

Q. Calling your attention to the 1400 Black Rock as shown upon plaintiff's exhibit 24, and the same level as shown on defendant's exhibit 82, on the latter exhibit there is represented here to be from station 455 west through 447, 446 and out to and including 309 on the northern boundary of the stoping in red shown there a blue line. Is that intended to represent gouge?

A. Yes, that is the intention.

Q. Is there gouge there?

A. There is undoubtedly gouge there but I have seen it
1330 in only just a few points. I have seen it at the extreme westerly end of the workings and I have seen it on the second floor of the stope about opposite 247, I think. I will look that up—no, about opposite cross cut No. 1410.

Q. Does that gouge there in your opinion represent the northern boundary of the Black Rock vein on that level?

A. I think it does.

Q. Is there any corresponding gouge represented on plaintiff's exhibit 24 or anywhere near it?

A. No.

Q. Proceed.

A. However, I don't understand that they have attempted to represent gouges, Mr. Dickson.

Q. Is that a post-mineral gouge?

A. Yes, I think so. I think it is one strand of the Black Rock fault probably.

Q. Which you have been following down from the surface?

A. Yes.

Q. Proceed.

A. Night before last I went down to the 1700 foot level of the Elm Orlu to examine again the drift along what the plaintiffs have called the Jersey Blue vein. I found a drift 22 feet long starting as nearly as I could tell from about the point marked on plaintiff's exhibit 26 where a blue line crosses working 1701. This drift follows a ways——

1331 Q. Do you understand that to be a vein that is claimed by the plaintiffs to be the Jersey Blue or Black Rock vein as disclosed in this 1700 foot level of the Elm Orlu?

A. I do.

Q. Proceed.

A. The drift followed a vein which was probably four feet wide at the point where it leaves the cross cut and is five or six feet wide

in the face of the drift or 22 feet from the cross cut. The men were still driving, at least I thought they were; men were working in there at the time we were there and it has probably advanced more now. Starting out from the crosscut it had a course of south 67 degrees east; at the face it had swung around to a course of south 73 degrees east, showing a gradual curve to the north, nearly an east and west direction. There was a quarter inch of gouge on the north wall. That wall had a dip to the south of about eighty degrees; measured in one place it was 78, in another place it measured 83—about 80 degrees to the south. The vein contains crushed and altered granite and I think I saw a little galena in it in specks; I think I saw a little zinc in it in small specks and considerable manganese. It is dry, unusually dry. It will probably get wet after it has been opened for some time, but it is dry now. And from that vein southwesterly along the cross cut for a distance of about 19 or 20 feet southwesterly from the vein as shown on defendant's exhibit
1332 84, for a distance 19 or 20 feet the granite, while quite fresh, at this time, appears to be very liberally impregnated with sulphide minerals, pyrite and chalcopyrite, and in addition there were many intersecting and crossing seams of manganese; but that condition seemed to terminate southwesterly against a quarter inch gouge seam which has a strike of north 86 degrees east and a dip to the south of 78 degrees. It is possible that the granite might be impregnated with pyrite and chalcopyrite still further to the southwest but I was not able to observe it. Beyond and to the northeast of a drift which has been driven, and which—to the northeast of a drift which has been driven on what the plaintiffs call the Jersey Blue vein at this level, into the space, we find the same condition of criss-cross, joint seams of manganese and quartz running in and out, from half an inch up to eighteen or twenty inches. In the face, as I saw it then, there was just in the corner, in the upper left hand corner of the face—there was exposed another gouge which has a strike of north 70° west and dips to the south 76°. They had a round drilled and about ready to blast on this face at that time and possibly by now something more will be exposed in connection with that; but I think I saw zinc beyond that gouge—I don't know whether I did or not; it looked like it; I could just barely get up on tip-toe and see it. Taking the conditions as we found them on the 1500 level and the 1400 foot level of the Elm Orlu, leading into the same position with reference to the Black Rock vein that the
1333 1701 crosscut has now probably reached, we find conditions quite similar to those that we found down here on the 1701. We find seams of ore, seams of manganese, seams of quartz.

Q. You are speaking now of that portion of this crosscut nearly northeasterly of what was shown upon the defendant's exhibit 84 and which was opened to correspond with the portions of what plaintiffs claim is the Jersey Blue vein on the 1700 level of the Elm Orlu?

A. No, I would include what they claim as the Jersey Blue vein as representing a part of the same conditions that we saw on the other two crosscuts above that; that is to say, seams of quartz and zinc and manganese leading out as you come in a southeasterly direc-

tion. You can see the same thing, as far as that is concerned, in a great many places along the south side of the ore body, close to the east end of the Black Rock, and it simply indicates to me that they are approaching the main Black Rock vein with that working and does not indicate to me that they cut a vein which in its downward course intersects and passes through the Black Rock vein as we understand it.

Q. Is there anything in the position of the Black Rock vein as found on the 1400 and the 1500 levels of the Black Rock and the position of what they claim to be the Black Rock vein, disclosed in that crosscut on the 1700 foot level as to the dip of the Black Rock vein as found on the 1400 and 1500 levels, and the dip of
1334 the vein which they claim to be the Black Rock and Jersey Blue on the 1700 level that tends to refute that claim? If so, state it.

A. Well, the Black Rock 1400 foot level is about 160 feet above the Elm Orlu 1700 foot level and the vein in the Black Rock 1400 foot level is further north than the face of the 1701 crosscut, when I last saw it. The vein on the 1400 foot level of the Black Rock dips to the north.

Q. About what angle if you know?

A. Rather a high angle. It is in the neighborhood of eighty degrees, but carried down for a distance of 160 feet it ought to be about 25 to 30 feet farther north on the 1700 foot level of the Elm Orlu than on the 1400 foot level of the Black Rock.

Q. And how far is what they claim to be the Jersey Blue vein on the 1700 foot level of the Elm Orlu south instead of north, south of where you have the Black Rock vein on the 1400 foot level?

A. Taking the north wall, which is the only really definite wall, and the vein which they call the Jersey Blue on the 1700 foot level of the Elm Orlu is sixty feet south of the north wall of the Black Rock vein on the 1400 foot level of the Black Rock mine.

Q. What is the character or grade of ore in the Black Rock vein on the 1400 foot level at the west end?

A. It looks to me like solid zinc ore.

Q. Anything comparable to that ore,—could be compared with it—in the grade of ore in what they claim to be the Jersey
1335 Blue vein on the 1700 foot level?

A. No, there is not, but as I said very early in my testimony this afternoon you can go sometimes through altered granite into clear, good zinc ore any—in a foot of distance.

Q. Quite abruptly?

A. Yes.

Q. But the vein as developed on the 1700, what they call the Jersey Blue or Black Rock vein, the full width of it as shown in that crosscut, does it contain any values?

A. Oh, no, nothing commercial at all but I think I saw some little spots of zinc in it.

Q. Have you reached a conclusion as to whether or not that vein which the plaintiffs claim to be the Jersey Blue vein on the 1700

foot level of the Elm Orlu is the Jersey Blue vein or Black Rock vein?

A. No, I don't think it is. I think it is one of those spurs that you find leading out into the walls of the Black Rock vein from one end of the workings to another and dying out in the country rock.

The Court: How wide is it?

A. When they first started on it it was about four feet wide and it is five or six feet wide in the face, with crushed and altered granite impregnated with mineral.

Mr. Dickson: From all the observation you have made or have been able to make, Mr. Burch, does the Black Rock vein on
1336 its course on any level fault or cross what our friends on the other side term the Rainbow lode?

A. I do not believe it does.

Q. Does the Black Rock vein in your judgment anywhere in its downward course intersect the Rainbow lode, pass through it and on beyond it to the south?

A. I don't think so.

Q. Have you reached a conclusion as to whether or not the Black Rock vein in its downward course unites or merges with any branch of the Black Rock-Elm Orlu vein?

A. I think it does merge with a branch of the Elm Orlu vein, yes.

Q. At about what level do you think that merger commences?

A. It depends upon the section.

Q. I understand that it has a plunging connection as you go to the west?

A. Yes. The union is higher to the east than to the west.

Q. Taking the easterly portion, about what level do you think that merger or union commences?

A. Section 23 as shown on defendant's No. 86 passes through a line about 200 feet easterly from the west end line of the Black Rock claim. Along the line of that section I would say that the two veins, as such, are connected by a link and therefore merged temporarily at least at or about the 1100 foot level of the Elm Orlu, or
1337 slightly above that. Looking at section 21, which is on the west end line or substantially so of the Black Rock claim, I would say that the junction is substantially on the 1300 foot level of the Elm Orlu or slightly above that, with the spur or branch of the Elm Orlu vein. Apparently they separate again and I believe they do separate again absolutely in their downward course, both then going down as individual veins, the Elm Orlu along its fissure and the Black Rock along its. There is a connection made by the spur from the Black Rock vein and a spur from the Elm Orlu vein at or about, probably a little below the 1300 foot level of the Elm Orlu.

Q. I wish you would give us a description, Mr. Burch, of the character of country covered by these two planes of section between the Black Rock vein in its vertical course and the southerly branch as shown upon this section of the Elm Orlu vein in its vertical position—the country between which this ore connects or makes out from one to the other, or where there is continuous ore from one to the

other, as to its being fractured or broken or how you account for that mineralization lying between the two vertical, practically vertical dipping Black Rock and Elm Orlu veins?

A. I better take that on the plan, I think. Section 23 to which our attention was just called a minute ago crosses Defendant's Exhibit No. 73 as shown by my pointer (indicating).

Q. That is, on line 23?

1338 A. Line 23, yes. The same section appears on Defendant's Exhibit 91, the same section that was shown on the wall, and the 1100 foot level of the Elm Orlu is where I hold my pointer there (indicating). Changing again to the plan as shown on Defendant's Exhibit 73 we have a working 1117 which crosses that line of section but in general is nearly parallel with it. I think I better refer to my notes for a description of that—I thought I had something a little more definite than my memory but apparently I have not. My note simply says with reference to the working 1117: Innumerable zinc, manganese and quartz seams in thoroughly altered granite from one half inch to eight inches in thickness" in every set across from drift No. 1114 to the raise shown at the northeast end of working No. 1117. My memory of it simply coincides with the note and I have no different details other than that.

Q. Other than what?

A. Other than what I have stated, that there are numberless seams of quartz, manganese and zinc crossing at all angles and in all directions. It is a region that is pretty thoroughly broken up in such blocks as granite naturally breaks into, irregular shapes, and along all of these seams in the broken granite there are now the seams of quartz and the seams of manganese and the seams of zinc, all ranging from a half inch up to eight inches, and running in a great many different directions and very closely spaced.

1339 Q. Connecting it as a mass into commercial ore?

A. Not commercial ore from 1117.

Q. In any level?

A. Below that we have to pass down—well, substantially to the Black Rock 1300—really we don't get to commercial ore at any point clear across. On the Elm Orlu 1300 we have commercial ore across nearly the entire space as shown by the stoping, but there is a section to the north of the Elm Orlu stopes where there is no commercial ore.

Q. About how long?

A. That is 35 feet, I should say. But below that again on the 1300 foot level of the Black Rock we have commercial ore in that part of the vein and a section to the south in which there is no commercial ore. Do you want me to finish this? I wanted to take up Section 21.

Q. All right, go ahead.

A. Section 21 as shown on the block model passes through the line 21 shown on Defendant's Exhibit No. 77 and on the 1300 foot level of the Elm Orlu there is commercial ore along this section from working 1302 northward to and including the working 1312 and the working 1320 which is on the Creden vein, branch vein of the

Black Rock, as has been shown on the section 21 of the block model, coming down here.

South of that working 1302 we have no accessible workings on this level 1300 Elm Orlu, except one that is probably on the copper vein; but just to the east of that section and nearly to Section
1340 23 there is commercial ore developed across from working No. 1312 to station 247; that is what is known as the Winchell stope, and it is a very good stope.

Q. It ought to be from its name. There is a working numbered here 1320. Is that intended to represent the Creden vein on the plan?

A. Yes.

Q. You alluded a moment ago to your opinion that the plane where there is mineralization extending from the Elm Orlu vein northerly to the Black Rock vein—that below that, which would be about the 1400 foot level, we will say roughly, of the Black Rock claim, that the two veins again went down separately below where they united on the ore?

A. Yes.

Q. Upon what do you base that opinion?

A. Referring to the 1200 Black Rock, defendant's Exhibit No. 78, you will observe that midway between sections 21 and 23 and just south of working 1202, the Bruce raise——

Q. Can you refer to that on the model?

A. Yes, in a moment. There is a continuous vein of good zinc ore followed in working 1202 from the portion of it which has been stoped up from the cross cut in which station 399 and 400 appears—there has been continuous good ore from the last named cross cut to the top of the Bruce raise; how much further it goes I do not know, because that working is caved right near there. Then re-
1341 ferring to the model, Defendant's Exhibit No. 101, the working which I have referred to on Defendant's Exhibit 78 is shown where I place my pointer, and the Bruce raise is so named on this exhibit.

Q. Extending upward to what level?

A. Extending from the 1500 foot level of the Elm Orlu up to the 1200 foot level of the Black Rock, a distance of about 160 feet. It passes through the 1400 foot level of the Elm Orlu and is jogged or broken there across a distance of about 15 or 20 feet, all of which is in solid zinc ore. This raise was driven by the Butte & Superior Company from the 1500 level of the Elm Orlu up to the 1400 of the Elm Orlu, and was driven by the Elm Orlu Company for the Butte & Superior Company from the 1400 Elm Orlu up to the 1200 level of the Black Rock.

Q. What is the upper portion of that raise in?

A. It is also in solid zinc ore. Since it was driven the Elm Orlu Company has commenced enlarging the opening on the 1400 Elm Orlu level, with which these two raises are connected, and that enlargement out to the east is also in good zinc ore. Apparently they are beginning to stope that ore at that point since this work was done.

The Court: What is the conclusion; you were going to say something to show why you think there are two veins below?

A. That is one vein.

1342 Mr. Dickson: That is what I am on, your honor; I have not finished yet.

Q. Point on the model where you have that mass of ore or mineralization extending from the Jersey Blue or Black Rock across to the Elm Orlu on the 1300 foot level; where is the bottom of it as shown on the model?

A. The bottom of it as shown on the model is shown where I hold my pointer now, just about on top of the 1300 foot level of the Elm Orlu, and inclines downward somewhat to the east. From that horizon going downward, we have shown here on the model Exhibit 101 the stopes on the Black Rock vein continuing on down to the 1400 foot level of the Black Rock mine.

Q. That is away below where you have the mineralization extending from one vein to the other?

A. Oh, yes, a long distance below.

Q. Now, here at the Butte raise, state whether that goes down 160 feet below the plane or horizon where you have the ore making out from one vein to the other?

A. It does; it goes down about the same distance on another fissure; on the Elm Orlu fissure.

Q. What is the dip of the vein as disclosed in the Bruce raise, as compared with the dip of the Elm Orlu Black Rock vein from the surface down through from that horizon to where we have the mineralization making out from one vein to the other?

1343 A. It is substantially the same; we cannot determine exactly what the dip is from that raise and those workings alone, because they are simply within the body of the vein.

Q. It is not disclosed in the raise?

A. No, it is not, but it is very nearly vertical. The raise itself is vertical, and the vein is substantially vertical, which is about the average of the Elm Orlu vein from the surface down.

Q. Except in the intervening block where the mineralization extends from one vein to the other?

A. Yes.

Q. Have you made an examination recently and how recently, to ascertain where in your opinion the north boundary wall of the Elm Orlu vein crosses the south side line of the Black Rock claim; how far easterly of the southwest corner of the Black Rock claim?

A. I have. I can scale that. A raise has recently been put on Defendant's Exhibit No. 65, a raise which I visited night before last, and which I am sure is within the vein where it crosses the south side line of the Black Rock. The western side of that raise where it crosses the south side line of the Black Rock claim is 190 feet easterly from the southwest corner of the Black Rock claim, and I believe that the north wall of the vein crosses the south side line of the Black Rock claim at least as far west as the edge of that raise, which would be 190 feet from the southwest corner. It may be a little further west, but that is as far as the developments show.

1344 Q. There has been very recent work done there?
A. Yes, very recent work.

Q. Where have you fixed from your observation—how far easterly of the same corner of the Black Rock claim does the southern boundary of the Elm Orlu vein cross that side line?

A. Well, that is a little bit indefinite also, but I should say that the altered granite containing quartz seams goes easterly to a point about 38 feet from the east end of trench E, which is erroneously shown on Defendant's Exhibit 64 as tunnel E, which would be a distance of about 300 feet or 301 feet from the southwest corner of the Black Rock claim to the point where the south wall of the vein crosses the south side line of the Black Rock claim.

By the Court:

Q. How wide is the vein?

A. The vein, measured along that line would be about 110 feet wide; but measured at right angles it would be only about 50 feet wide.

By Mr. Dickson:

Q. You include in that all the altered granite, I suppose, that you think ought to be included within the limits of the vein?

A. Yes, sir.

Q. I will ask you if the Bruce raise, which you say follows down this southerly branch, the main branch of the Elm Orlu, if that is vertically beneath the Elm Orlu ground?

1345 A. It is.

Q. And the Jersey Blue vein as followed to the deepest working that you have pointed out here, that is under what claim, the Black Rock or the Elm Orlu?

A. You mean the Black Rock vein?

Q. Yes, the Black Rock vein.

A. Yes, that is under the Black Rock claim.

Q. One question I asked you yesterday you did not quite fully answer and that had reference to the mineralization and ore extending from the southerly main branch of the Elm Orlu vein to our Black Rock vein in the vicinity of the 1100 level Black Rock to and somewhere below the 1300 level of the Black Rock. What is your opinion as to how that mineralization was affected?

The Court: I don't quite get your question.

Mr. Dickson: The large ore body from the 1100 to the 1300 Elm Orlu, where the ore makes out, from the mineralization clear across from one vein to another, and then below that they go down in separate veins again?

Mr. Gray: What do you call that, the Creden?

Mr. Dickson: The Creden would be in that, part of it.

A. I would say in reference to that, in that region which is somewhat local both vertically and longitudinally, limited to perhaps 250 or 300 feet up and down and about the same length——

Q. East and west?

1346 A. East and west—that there has been a more than usually intense fracturing across from one fissure to the other with the result that in the thoroughly broken up granite which was there originally, the granite has been replaced almost wholly by zinc ore. The fissures above, continuing on their own course from the Black Rock go to this point, to the Elm Orlu, through the Elm Orlu ground down to this point, they join locally there near the space to which I have referred and below that the Black Rock in the Black Rock ground, the Elm Orlu in the Elm Orlu ground continue on their downward course again. The fracturing is quite plainly observable in what is known as the Winchell stope shown on defendant's exhibit 77 between drifts 1312 and 1302, and the ground adjacent to that. That chanced to be the first stope in either mine that I went into and climbing up a man-way, where I hold my pointer now, into the stope the first thing that struck me was the structure running crossways of the stopes. I could scarcely believe my eyes and thought my compass was wrong and went down to the man-way again and then came up again and observed that instead of the ore running longitudinally with the wall, as I would naturally expect, the structure in that stope is almost at right angles to the wall, showing the cross fractures that were opened up across from one fissure to another.

Q. And is it your opinion that all the mineralization found

1347 in these veins, the Black Rock and the Elm Orlu, was deposited from ascending solutions?

A. That is my opinion, yes, sir.

Q. And as they came up, the solutions, through the Black Rock fissure and the Elm Orlu fissure and encountered this broken country, they had a free channel for circulation?

A. Yes, and mingled from one across to the other.

Q. Have you observed elsewhere than the Winchell stope in the Elm Orlu vein a transverse structure, transverse to the strike of the vein?

A. I find in several of the stopes from the west end of the Black Rock Elm Orlu workings to the easternmost workings of the Black Rock, and in all of the stopes that I visited, I saw both the longitudinal and the transverse structure. The transverse usually was very much as delineated upon the various exhibits of the defendant. Little fissures making across the stopes, something carrying a little gouge, too, indicating post mineral movement in the ore body; and beyond the limits southward of the ore body, wherever it is possible to see such points in the cross cuts, we see the rather barren continuation of these same little transverse fissures. As Mr. Searls has said, there are hundreds of them. I myself would say there are scores of them anyway; and such a fissure as that is the one which appears——

By the Court:

Q. Beyond the ore bodies going south it appears barren,
1348 you say; where do you mean; before you get to the main fissure?

A. No, your honor, what I refer to is that after you leave the ore body going out southeasterly into the country, you find the continuation of the same structure that you find in the ore body itself, in the form of little fissures leading out southeasterly and easterly from the ore body itself. They are so numerous that there would be no difficulty whatever within a short distance in picking up one such as was followed by working No. 25, being the tunnel level shown on Defendant's Exhibit 65.

By Mr. Dickson:

Q. Have you examined the so called Pyle branch of the Elm Orlu vein and the Pyle raise therefrom?

A. I have examined that on the levels where it is exposed, and also in the raise from the 700 foot level Black Rock upward, and from the 450 level of the Black Rock upward. I have not been through the raise below the 700, but I have seen the levels on the 1100 Black Rock, the 800 Black Rock, the 700 Black Rock, and the raise from the 700 up.

Q. Taking the 700 Black Rock level, the Pyle branch on that, do you know whether that work was done during the present year or when it was done?

A. It was completed since I came here in August. I don't know when it was commenced.

Q. And the 800 drift on the Pyle branch?

1349 A. Well, that is still in progress I understand; it was the last time I was in there.

Q. I wish you would take up the Pyle branch and the Pyle raise as far as you have been able to observe and examine them, and state to the court what your observation and what conclusions if any you drew therefrom, respecting the top or apex of the so called Pyle branch in the Pyle raise and immediately adjacent thereto?

A. For the purpose of doing that I will refer to Defendant's Exhibit 101, being the skeleton model. On the 1100 foot level of the Black Rock and on the 800 foot level of the Black Rock the Pyle vein has been developed for a considerable distance. On the 700 Black Rock it has been developed a little distance also. Going upward from the 700 foot level through the Pyle raise I was able to find quartz mineralization up as far as the little stub drift projecting out southeasterly from the Pyle raise at a distance of about 70 feet below the 450 foot level of the Black Rock. Above that I was not able to find any quartz or any evidence of mineralization in the raise, but the raise was lagged.

Q. Closely?

A. Quite closely when I saw it, and I would not attempt to say that there was none. Except that at a point about 30 feet below the 450 foot level I saw the roof of the raise.

Q. The workings to which you refer as 450 is marked on plaintiff's exhibit 1 as 455?

1350 A. That is the drift, but it is the 450 foot level. It is the 455 drift on the 450 foot level, and about 20 feet or 25 feet below that 455 drift I saw the roof of the raise where it has been driven, and in that I saw little stringers of quartz up to half or three quarters of an inch with a little crushed granite up to a width of three or four inches along the line in crushed granite. There were two or three of these stringers as I remember it but not such as I would designate as a definite vein. On the other hand, at the little short stub drift 70 feet or so below the drift 455 I did see what is unquestionably a vein. I will refer to my notes on that. The vein consists of six inches of quartz with one or two feet of altered granite alongside of the quartz and extending from the quartz over to the gouge, say perhaps one or two feet from the quartz.

Q. What is the course of that seam?

A. The course of the gouge seam at that point is north 75° west; the course of the quartz seam was north 65° west. The dip of each of these was 86° to the south. On the 450 foot level of the Black Rock and within the working 457 and working 455 I see little parallel quartz seams running along a gouge that I believe may be and probably are the upper continuation of the one which I saw in the little stub drift 70 feet below; but I haven't seen any connection through and it is possible that the gouge which I saw in the little stub drift 70 feet down may continue, having such a nearly

1351 vertical aspect—may continue outside the limits of the raise upward and be represented by the gouge fissure which appears on the 500 foot level on the Elm Orlu at the point where I am holding my pointer near the Pyle raise, and which has been followed by a drift westerly on the 500 foot level of the Elm Orlu, a drift which apparently is not numbered on this model—No. 508 as shown by defendant's exhibit 57.

Q. And on the model that lays between crosscut- 541 and 517?

A. No, it is between this crosscut on the top of the raise, where I hold my pointer. And then there is found a barren gouge fissure dipping from 53° to 72° to the south and it is possible that that might be the upward continuation of the Pyle fissure in a barren section, in a section where there is no mineralization in the fissure itself. Those are the two conjectures that seem to be the most probable, but I would not attempt to say that either one of them is demonstrated. If either one is true, and I believe that one or the other is true, then the upward continuation of the Pyle vein would pass into the Black Rock ground over the south side line of the Black Rock before reaching the surface, and either one would correlate fairly well with drift No. 4, I believe it is called on the Clark tunnel level shown by my pointer, on defendant's exhibit 101.

Q. Can you point to that on one of the level sheets?

A. Shown as my pointer indicates.

1352 Q. Which one is that?

A. No. 4.

Q. Referring to what exhibit?

A. Referring to defendant's exhibit 65. Now, the vein would have to have, going upward in that manner—in order to reach the point named, the Pyle strand would have to have something near the same dip that the main strand of the Elm Orlu vein has from the surface down to that point. The two could not be very far different in dip to correlate in the way that I have said; but I am bound to admit I do not know what happened to that Pyle vein in going up. These two things seem to be the most probable.

Q. From the top to where you found the vein, six inches of quartz and two feet or such a matter of altered granite—point that out.

(Witness indicates.)

Q. That is about how far——

A. That is about seventy feet below the 450 foot level of the Black Rock.

Q. And what is the distance from that vertically to the surface?

A. It is about 500 feet or 510 feet.

Q. What would be the angle of dip if the vein—Pyle vein where you last observed it in the raise at the point you are now speaking of in the raise as there dipping to the south—what would be the angle of dip if you followed it upward to bring it within or north of the south side line of the Black Rock?

1353 A. To be within the south side line of the Black Rock?

Q. North of the south side line.

A. The dip would be about 83 or 84 degrees to the south.

Q. Mr. Sarles in an answer to a question on cross examination stated that the top of a vein as he had found it in the Pyle raise was 310 feet below the surface. Assuming that to be the fact, what would be the angle of the southerly dip, or the northerly rise, to carry it north of the south side line of the Black Rock? You may take 300 feet, if that will make it any easier than 310 feet. The top where he found it is indicated in red on Plaintiff's skeleton model at this point.

A. That is a short distance below the 500 foot level of the Elm Orlu.

Q. Well, I will ask you, taking it on Plaintiff's model, what is the distance from the top of the vein as shown in that raise, to the surface?

A. It is about 460 feet.

Q. Now, taking 460 or 450 feet as being the distance, what would be the angle of southerly dip, the degree of dip to carry it in its upward course to the surface north of the south side line of the Black Rock claim?

A. It would be about 80 and one-half degrees to the south.

1354 Cross-examination.

By Mr. Gray:

Q. Mr. Burch, in undertaking the investigation of the questions presented in this case, did you give any study to the subject of the

general structural geology of Butte, as developed in the last 20 or 30 years?

A. Very little.

Q. In other words, you have confined your investigation solely to the properties in controversy?

A. Practically so, yes, sir.

Q. And in testifying, you are only giving the conclusions which you reached from an investigation of those particular properties?

A. That is true.

Q. You are not taking into consideration the literature on the district, but rather your own personal observations of this property that you have examined?

A. I think so. Of course I have read some things in connection with the district—that is, with the geology of the district, but I don't think that I gave that any weight as compared to what I could actually see in the ground.

Q. Of course you are familiar with the fact that there have been many questions of law and geology arise where the old veins are cut by the northwest veins and in turn are faulted by the northeast veins here?

A. I did not know of the questions of law, no.

Q. Questions of geology?

1355 A. I knew there had been questions of geology in connection with them.

Q. You did not appeal to the investigations made in any of those other cases to aid you in your conclusions?

A. No.

Q. Where is the Deadwood vein stoped?

A. The stope on the Deadwood is in progress now. Rfeerring to Defendant's Exhibit 74, it is in the vicinity of where the word "vein" appears in connection with "Deadwood Vein" in the northern part of the map.

Q. In 1032?

A. Yes, 1032.

Q. What is the character of the Deadwood vein as disclosed there; I want you to describe it?

A. I don't think I can describe it, because I did not pay very close attention to the Deadwood vein. I know it is a fissure vein confined between two rather plain walls at that point, rather clearly marked walls, with gouge on the walls, and I saw quartz and zinc, and that is about as far as I can go in the matter of describing it.

Q. What was the character of the gouge?

A. The gouge was a soft, running gouge, but I did not examine it carefully to see what its contents might or might not be.

Q. You would not say that it did not have fragments of zinc ore and of granite and vein matter in it?

A. No, most assuredly I would not say so.

1356 Q. How wide is the Deadwood vein being stoped there; how many sets wide?

A. I think it is only one set wide, is my impression, but I did not go up into the stope. I was rather surprised to find the stope there.

The first time I was through the mine there was not any, and when I came along I saw they were working one floor above the level, but I did not climb up into it.

Q. I think you are correct; the stope is one set high. That is on what level?

A. The 1000 Black Rock.

Q. If, above the point where you have contended in your testimony, there is a junction of the Jersey Blue and the Rainbow veins, where is the Jersey Blue stoped, on what level?

A. What we call the Black Rock?

Q. Yes; by referring to the Jersey Blue you are not to suppose that I am trying to catch you at all; it is what you call the Black Rock?

A. There is a stope on the Black Rock vein, the Jersey Blue branch, above the 1000 foot level of the Black Rock, and also an old stope just above the Black Rock tunnel level, up near the surface.

Q. Whereabouts is that other stope that you refer to?

A. You will observe on the tunnel map, Defendant's Exhibit 65, the word-, "Wolvin Tunnel" written across the Black Rock tunnel.

1357 At the word "Tunnel" there is a branch of the Black Rock tunnel, a short one running off to the southeast, and then, continuing eastward, that branch goes around the eastern end of this stope to which I refer. The western end is a short distance west of the Black Rock tunnel in the drift along the Black Rock vein, I should say perhaps—well, the chute that I saw is about 10 or 15 feet west, and the filling on top of the timbers, to my recollection extends about 30 feet—25 or 30 feet west of the Black Rock tunnel, and about the same distance east, making a stope about 50 feet long.

Q. Do you know how high that was stoped or how wide it was?

A. No, I don't.

Q. That was an old stope that you could not examine?

A. Yes, sir.

The Court: Did you say there was no other stope on the Jersey Blue Black Rock?

Mr. Gray: No, sir, I said it was an old stope.

Q. Except for that small stope you have referred to, there is no other stoping on what we call the Jersey Blue in the territory I refer to till you get to the 1000 Black Rock, is there?

A. I think there is, though I have not been in it.

Q. Where?

A. Right at the junction of the Jersey Blue, as you call it, with the Creden, just where I hold my pointer on the skeleton model, above the 1000 foot level of the Elm Orlu. I have not been in that stope.

1358 Q. So you cannot say?

A. No.

Q. So far as you know, this one on the 1000 is the only other one that you do know of that you have examined?

A. Well, I have seen the bottom of openings going up into that, but I have been in the one on the 1000.

Q. Well, just answer my question; the one on the 1000 Black

Rock is the only one that you have been into and know is within that vein?

A. That is correct.

Q. And that is stoped how many sets wide?

A. It is in some places only one set, and in other parts a set and a half, and I think two sets part of it.

Q. Where is the two sets; give me the floor?

A. I cannot give you the floor there, nor can I be positive of that statement, but I think that I saw it—I know I saw it a set and a half *feet* wide, and I think I saw it two sets wide, but I am not sure.

Q. Now, what is the character of that vein there; how are the walls marked there?

A. The north wall has a very definite heavy gouge. The south wall is not so definite.

Q. This Deadwood vein that you have referred to, you recognize as a fault fissure crossing in a northwesterly and southeasterly direction?

A. I think so, yes, sir, though the evidence of it is not very plain to me now. The stopes which appear on Defendant's Ex-
1359 hibit 74, being the 1000 foot level of the Black Rock and showing the displacement by the Deadwood vein, there has been very few of them accessible since I came here. I have been up in the northernmost one where the ore makes up against the Deadwood fissure and is certainly cut off there; but the ones further to the south on that same level I have not been able to get into.

Q. Does that vein, so far as you have been able to observe it, carry copper ore?

A. I don't know whether it does or not.

Q. Does it contain zinc ore at a point nearer to the surface than the 1000 foot level?

A. So far as I know I have never seen what I was certain was the Deadwood vein except by projection, nearer the surface and I never have examined any of the veins closely for mineral content.

Q. So you cannot say whether, from a mineral standpoint it is similar to what we term the Jersey Blue vein or not?

A. I would not attempt to say, no.

Q. Mr. Burch, you said something yesterday about post-mineral gouges and you produced two samples to the court?

A. Yes.

Q. And you gave it as your opinion that the gouges found in the Jersey Blue are post-mineral, what we call the Jersey Blue and what you call the Black Rock—did I so understand you?

A. No, you are not exactly correct. You used the word
1360 "gouges" and I simply referred to a gouge, which for a considerable distance followed the north wall of what you term the Jersey Blue vein, and from there eastward cuts across the vein, turns and united with the other strand of the Black Rock fault.

Q. Now, then, were there some other gouges in there that you observed that were pre-mineral?

A. I didn't observe any.

Q. Didn't refer to any?

A. I didn't observe any.

Q. Then all of the gouge or gouges you found in the Jersey Blue in your judgment were post-mineral?

A. The only ones that I saw in connection with the Jersey Blue.

Q. And you only saw one?

A. That is all except—there are places where it divides up into parallel strands, of course.

Q. You heard the testimony of Professor Emmons where he described the gouges on each side of the Jersey Blue vein?

A. I don't remember that.

Q. You don't recollect that?

A. No.

Q. And where the gouge was found on both sides you didn't observe it on the south side?

A. I don't remember observing a distinct gouge on the south side of what you term the Jersey Blue vein at its—at any point. I saw crushed granite in places but I don't remember seeing any distinct gouge.

1361 Q. So that in describing the gouge samples which you have presented to the court you only desire to be understood as representing the gouge that you have described as being the north wall which at some places, as you say, cuts through as it goes to the easterly?

A. Yes.

Q. Now, that place where it cuts through going easterly, just fix the point so I will not confuse with some other?

A. Taking——

Q. Just the point as nearly as you can?

A. It is not a point; it is a line.

Q. All right, a line?

A. Beginning with about station 831 as shown on defendant's exhibit 65 and extending southeasterly through the working from which crosscuts 15, 16, 18 and 19 depart.

Q. And through there, as I understand it, the gouge cuts through what you please to term the vein?

A. Yes.

Q. Why didn't you include the gouge in the vein and call it a part of the vein, Mr. Burch?

A. Well, if it is within the vein, it is of course a part of the vein; but it is—but it was not a part of the vein originally up to the time of the post-mineral movement.

Q. How are you able to make that statement; from what facts do you draw that conclusion?

1362 A. The gouge that I refer to is of the same nature, same character, and I believe of the same age as the gouges—other gouges following branches of the Black Rock, faulting it on its eastward course, turns and unites with them. It cuts across the veins of quartz, shearing them off, the little quartz veinlets, shearing them off on the side of the working. It has fragments of the same quartz between its strands wherever there chances to be two strands exposed within the workings; and the Black Rock fault does the same thing. It has the mineral contents of the vein ground up within it.

Q. Now, to be specific, you say that it is of the same nature as the Black Rock vein?

A. Black Rock fault—fault gouge.

Q. By that you mean that it has the same fragments of ore or quartz within it?

A. Yes, ground up vein matter; ground up ore; ground up quartz and fragments.

Q. In that respect you did not compare it with the gouge of the Deadwood vein to ascertain whether it was similar to the Deadwood vein, did you?

A. I did not.

Q. Did you compare it to the gouge of any of the fissures which your associates recognize as northwest veins?

A. No, I did not.

Q. Can you say what the character of the gouge in these
1363 fault fissures in the Butte district is as to containing fragments of ore and quartz?

A. I cannot.

Q. But you do to a larger measure—but you do in a large measure base your opinion that this is a post-mineral gouge upon the observations you made and which are represented by the two specimens of gouge that you showed his honor, showing the fragments of ore, quartz and granite within it?

A. In part. But before finding these particular gouge specimens I found I suppose twenty little particles, pieces of quartz and ore ground up which I threw away, having found something better.

Q. But I say that is the principal observation which forced you to the conclusion that it was a post mineral action?

A. That is one of the observations, the principal one, yes, that it is a post-mineral gouge.

Q. By a post-mineral gouge just what do you mean?

A. I mean a gouge which has be-n formed after the mineralization occurred which it cuts or alongside of which it runs. It is later, in other words, than the mineralization because it has within it the ground-up products of mineralization.

Q. In other words, you mean that it is later than all of the mineralization of the vein through which it cuts?

1364 A. Not necessarily; not necessarily, no; certain little pieces which it grinds up.

Q. Do you think that the faulting and mineralization would be co-incident?

A. It is possible that there might be a period of faulting, a period of mineralization, a later period of faulting and a later period of mineralization, or they might to some extent go on side by side, I think.

Q. Now, then, if they were intermittent as you have indicated, what would you call the gouge?

A. If they were intermittent I would call it post-mineral as to part of the mineralization and pre-mineral as to another part.

Q. Well, how would you by your samples and your examination of it determine whether it was post-mineral or pre-mineral?

A. Because the gouge itself is crushed and so far as I can see does not show any signs of having become mineralized by the mineralizing solution after it was formed.

Q. That is the only test you apply?

A. That is the only test I am able to give it.

Q. Now, suppose they were co-incident, how would you determine whether it was post-mineral or pre-mineral?

A. If they were co-incident?

Q. Yes.

A. I would be stuck; I wouldn't know how. I might add
1365 to that, however, Mr. Gray, that while I would not be able to determine whether it was co-incident or whether it was pre-mineral, I would be able to determine whether on the one hand it was post-mineral or whether on the other hand it was either co-incident or pre-mineral.

Q. And it is your wish to be understood as describing the gouge, the one gouge that you saw on the Jersey Blue vein as post-mineral?

A. It is.

Q. Now, you said something about the cross structure of the ore bodies, and that which you found in the granite outside the ore bodies?

A. Yes.

Q. Is that older or later in your judgment than the ore deposition as a general thing, if in some places after the deposition of the ore there had been a little subsequent movement, a little subsequent readjustment which produces little tiny gouges within the ore body itself.

Q. But where you find the quartz and the vein matter extending out, it is your opinion that these fractures were older than the mineralization?

A. I don't know that I described quartz as vein matter extending out.

Q. Well, did you then——

A. But there are little stringers that do go out.

Q. Where you find these fractures going out in the granite generally, is it your opinion that they are older or do you want to qualify your answer?

1366 A. That exhibit——

Q. Now, not referring particularly to the exhibit, Mr. Burch, but where you have referred all through the property to the fractures, which some of the witnesses have referred to as horsetail structure, as going out into the granite, is it your wish to be understood as fixing the period of these fractures as earlier than the mineralization?

A. I think as a rule the fractures were earlier than the mineralization, but that there have in some cases been movements along the same fracture since mineralization.

Q. That is post-mineral faulting?

A. Yes.

Q. Referring to the fracture followed on working 25 of the Black Rock tunnel level, in your judgment that is older then than the rest of them?

A. I think that is probably one of the same group, of which there are scores.

Q. Has it post-mineral gouge in it?

A. It has.

Q. How are you able to determine that; by fragments of the ore or quartz within the gouge?

A. I did not examine for the fragments—for the fragments because the gouge is so very very tiny and narrow that any particles you could see or could find would be pretty small, but I would say it cut across little stringers of quartz that run up against it
1367 and that is proof that it is at least later than those stringers of quartz.

Q. Beyond that, you have nothing to say concerning its post-mineral character?

A. No.

Q. Referring now to your exhibit 114, that represents a section across the working from 831 to the point "A"?

A. Yes, that represents a section through a portion of that wherever there chance to be two gouges revealed within the width of the drift.

Q. Does that represent the wall of this particular vein or veinlet which you were following?

A. No, wasn't any veinlet being followed.

Q. What do you call such a fracture or fissure as you have exhibited by exhibit 114 with two gouge walls and quartz matter between them?

A. That is the fault to which I have referred that follows for a long distance along the north wall of the Black Rock vein and the section to which you are now referring cuts across it.

Q. It has two distinct seams, I judge, has it not, there?

A. It has for a short distance two distinct seams. I will show you my notes on that.

Q. I don't care about your notes; I will take your word for it.

A. But perhaps I would prefer to refresh my memory
1368 although I know just exactly what my notes will show?

Q. All right.

A. It is a branch of the fissure—branching of the gouge, and for a short distance the two branches would be nearly parallel with each other, then one goes off into the wall; then you would have a single one for a few feet and then another branching, and for a short distance the two branches are nearly parallel as shown here and then another branch goes off into the wall.

Q. That is as you follow southeasterly?

A. That is as you follow southeasterly that is the condition; so that for a few feet along the drift you would have the condition I have portrayed here. Then you would have a single gouge for a short distance, then you would have another branch making off from it.

Q. In a southeasterly direction?

A. In an easterly direction. The branches all make off to the north side of the main one, which has been followed through to its connection with the Black Rock fault.

Mr. Dickson: The north side?

A. The branches all go off, is my recollection, to the north side of the drift as you go easterly.

Mr. Gray: Did you make a sketch from which you represented this section 114 or does it represent some particular place in that drift referred to?

A. It represents almost any place on that drift where there
1369 chance to be two gouges in the limits of that drift.

Q. Any place where there are two gouges?

A. Yes.

Q. Mr. Burch, do I understand you to say that you were unable to observe any quartz or vein material following parallel to the gouge that runs through that working?

A. I was not able to observe any.

Q. That is open where it can be observed?

A. Yes, it is. The roof is lagged in places, but at the same time, by using care, you can see nearly all of it, and I spent considerable time in looking at it.

Q. So that is one working that can be visible today and the correctness of the observation of the witnesses ascertained?

A. I think so.

Q. In the Dewey tunnel you say the Jersey Blue or what you call the Black Rock is exposed?

A. In the Dewey, yes, the Dewey cuts across it.

Q. Is it your wish that the court understand you as saying that vein extends from the drift "E" up to the end of or practically the end of crosscut 6?

A. Yes, that is a part of the vein, yes.

Q. And you wish to be understood as indicating that all of that is within the Jersey Blue vein?

A. I so consider it.

Q. Mr. Burch, how does it happen that here you did not observe the gouges that are shown by your exhibit 65 and report
1370 them, one on the south wall and one on the north wall, if that be one vein?

A. I don't think that the one on the south wall is continuous.

Q. As shown on your map, Exhibit 65?

Mr. Dickson: Refer to your notes.

A. On the contrary, I know certainly that it is not.

Q. Then the map incorrectly represents the fact there?

A. The draftsman probably connects it to—it does not show continuous on the map.

Q. Doesn't it?

A. It does not.

Q. Isn't it indicated through this drift No. 3?

A. Here is one that comes across here, and another comes in and goes across there and another in here and another here.

Q. You have indicated five already in the working between the station and this point on that drift, haven't you?

A. No, two there.

Q. Indicate what the map shows with reference to that; the map shows continuous gouge, doesn't it?

A. I will put on my glasses. I see running from station 813 to the jog at station 829 a gouge delineated upon the map, which also shows a little stub branching off near 828 and another stub branching off at about 829, and that gouge continues to a point a little
1371 west of the so called Gulch tunnel, near the terminus of it. There it is broken.

Q. About how many feet is broken there?

A. About ten feet on this map; then another one is picked up, and it goes on. That is how it is shown on the map Defendant's Exhibit 65.

Q. Now, going back to that working from 831 to the point A, those branches all make off on the north side?

A. As you go east, yes.

Q. In your judgment are the branches of the gouge that you have referred to as the Black Rock fault, and these branches that extend from it through what we call the Jersey Blue vein contemporaneous; are those faults in making those gouges contemporaneous?

A. I think so.

Q. What was the direction of the movement in your judgment upon that fault?

A. I don't know.

Q. Did you observe the Deadwood vein to be faulted?

A. I did.

Q. That is on the 1000 foot level of the Black Rock where that is observable?

A. Yes.

Q. Is it faulted by a branch of the Black Rock fault?

A. I don't know.

Q. Did you examine the fault there?

1372 A. No, not carefully; it was very obscure. I could see that the vein was displaced, but in attempting to see the exact fissure along which it was displaced I found great trouble in finding it.

Q. You could not say whether that fault was mineralized or not?

A. No, I could not. The fault was in the position which is shown by Defendant's Exhibit 74, that is, approximately so, but the exact line of faulting I was not able to see in there.

Q. Now, we have gone over this—are you able to observe the branch of the Black Rock fault as you have described it on the Black Rock thousand foot level and on the 400 foot level?

A. No, I was not. Where it should be is somewhere near the working 414, but when I got into the mine the point where it should cross 414 was crushed down and I could not see it.

Q. Where did you next observe it?

A. On the 800 foot level of the Elm Orlu.

Q. Let me see that, please; did you observe it there?

A. In that working which is called 808, going easterly from cross cut 817, I reached the point where the two observable gouges were approaching each other, or within one or two feet of each other, but I could not see the exact point of junction.

Q. And that is where?

A. It is easterly from—there does not seem to be a station. I will look at Plaintiff's Exhibit 13. I was out as far in that
1373 working as Station 104 as shown upon Plaintiff's Exhibit 13, but after passing station 107 the material on the sides of the drift and on the top of it became suddenly more and more crushed and much more difficult to identify.

Q. Now, that is near the co-ordinates 26 and 99, just a few feet from that corner, isn't it?

A. A few feet easterly from that, yes.

Q. Where did you find this same condition on the Black Rock tunnel?

A. Between station 831 and the letter A on Plaintiff's Exhibit 65.

Q That is about where you found it joining the Black Rock or the main strand of the Black Rock fault?

A. Approximately, yes.

Q. Then the Black Rock fault is strictly a dip fault, isn't it, Mr. Burch, in order to sustain your theory that it branches on these several levels as you have described, and that they are branches of the same fault?

A. Strictly a dip fault—what do you mean?

Q. Well, it is a dip fault. You know what a dip fault is, don't you?

A. No, I do not.

Q. The movement was practically vertical along that fault, wasn't it?

A. I don't know which way the movement was.

Q. How could you have it branching as you have described
1374 it here in the Black Rock tunnel and in the lower level without a great displacement, unless it was a vertical dip fault?

A. Oh, that would be easy.

Q. All right; explain?

A. Let me have a piece of cardboard (cutting cardboard). We will assume that the piece of cardboard marked A which I hold in my hand is the top of a block of ground bounded on the upper side by one fault, and on the lower side by another; the other two blocks of ground being B and C. It would be entirely possible, and easy in a horizontal movement of the block called A, to slide to my left as I place it, and downward or upward, and the block over to slide in the same direction horizontally, or downward or upward.

Q. Do you refer to that as two faults or as one fault?

A. They might all be occurring at the same time; they would be two branches of the same fault.

Q. Two branches of the same fault with a block of ground between? How could you have the relation which you claim exists on the level, say the Black Rock tunnel level; also depicted on the 800

level, with that branching, with only a foot or two—where you could follow the branches within a foot or two of where they coalesce or join, without what is called a dip fault or a vertical fault?

A. A movement downward vertically?

1375 Q. Downward vertically, yes.

A. I don't see anything against it.

Q. Could there be horizontal movement and still have that same relation existing on the 800 that you have on the Black Rock tunnel level?

A. I think I have so illustrated it.

Q. All right. Now, then, on the Niagara tunnel level you spoke of a place where the ground was caved and it was impossible to observe the exact condition?

A. On the Niagara tunnel level?

Q. I understood you to say the Niagara tunnel level.

A. I don't remember any place on the Niagara tunnel level.

Q. Was it on the Black Rock tunnel level? You said in going northeasterly toward the north line of the Black Rock there was a place there, some place near the discovery, where you were unable to observe the exact relation of the veins because of caving?

A. Oh, where I said I was in doubt whether the ground which I observed was really in place, or whether it had moved inward from the side of an excavation, or downward from the top?

Mr. Dickson: A caving, you mean?

The Witness: There is a very good reason for that.

Q. Indicate the place?

A. That is in the vicinity of the figure- 21, or around the figures 21 as shown on Defendant's Exhibit 65. I know that im-

1376 mediately east of there, near where the figure 9 appears upon this exhibit 65, that I can see in the bottom of the drift the filling of an old stope. Furthermore——

Q. I am not questioning what you observed there; I want to ask you a question about it?

A. Very well.

Q. The Niagara tunnel is right above that, isn't it?

A. No, it is below it.

Q. Below it, yes.

A. Yes, sir.

Q. You can observe the conditions there, can't you?

A. Oh, no.

Q. Just in the face?

A. Oh, no; directly under the Black Rock tunnel is a filled stope. You cannot see anything excepting old fillings.

Q. The Black Rock fault is clearly observable there?

A. The Black Rock fault is clearly observable, referring to Defendant's Exhibit 66, at a point about 400 feet south of the mouth of the Niagara tunnel; this is, one strand of it; and another strand of it is rather clearly observable, I think, along the portion of the south wall of the working which extends eastward from the discovery winze to the word "Black" on Defendant's Exhibit 66, but that is not so very clear.

Q. Well, how wide is the Rainbow vein as it crosses the north line of the Black Rock claim?

1377 Mr. Dickson: The Rainbow vein?

Mr. Gray: I call it the Rainbow; I don't ask Mr. Burch to adopt my name, and I don't ask him to be bound by it.

A. I should say, where it is indicated to cross that line it is probably about 100 feet wide.

Q. Now, if in the Mill tunnel at the point where the witnesses for the plaintiff claim that that segment which extends somewhat easterly to about Station 1118—where they claim it is faulted—if they are correct, and assuming that they are, where would the other segment be along that fault?

A. Well, I don't know.

Q. Aren't all of those faults—don't they all displace the vein to the left; that is, what you call a left handed fault?

Mr. Dickson: Traveling in what direction?

Q. Traveling north.

A. I don't know. All that I have observed, I think, do, but I am not sure of that without looking through my notes.

Q. Assuming that that fault exists at the place designated, and that it is a left hand fault, where would that other segment be?

A. It might be, and in my opinion is disclosed on the east side of the working which follows the so-called fault to the northwest. Apparently there is very little, if any, displacement, but a change in the character of the mineralization.

1378 Q. Referring to Plaintiff's Exhibit 22, you referred to the fact that the raise went upward on whatever gouge was shown in 1304 working. You called attention to the fact that the Jersey Blue as exhibited on Plaintiff's Exhibit 22 is somewhat to the southerly of that raise. Did you understand in the testimony of Mr. Green, who described this exhibit, that that represented the Jersey Blue upon the sill floor?

A. That was my understanding, yes, sir.

Q. And that it did not represent it in the stopes above?

A. There are no stopes above there.

Q. There was none, only a raise?

A. There is no sill floor made at that point.

Q. In what direction does the raise go up?

A. It goes up vertically for about 50 feet, and then it is offset one set to the south.

Q. And from that testimony you drew the inference that the Jersey Blue did not cross through as claimed by the witnesses for the plaintiff?

A. Why, certainly; I couldn't find it there.

Q. I observe on your exhibit 78 that you have the copper vein which has been described as a northwest vein, faulting the Black Rock fault, which you say is a post-mineral fault; would you draw the inference from that that the Black Rock fault occurred prior to the northwest copper vein fault?

1379 A. I should certainly draw that inference from that exhibit, but that is the first time I ever noticed it on the exhibit.

Q. So you would not want to suggest that those things are always delineated on the exhibits as they should be?

A. No; draftsmen do make mistakes.

Q. All right. I observe, Mr. Burch, that from station 683 on Defendant's Exhibit 74 to the co-ordinate line 22, there is a good deal of geology painted on Exhibit 74?

A. Yes.

Q. And there is but one point or working along that and that is in crosscut 1006?

A. Yes.

Q. Will you explain why the geology is left off of the workings in the Elm Orlu?

A. No; I don't know; I have never been in those workings; I don't think anyone could get in them now, but maybe they could; I don't know.

Q. With reference to Exhibit 76 the same is true; can you give any reason for not extending the geology on over into the workings in the Elm Orlu?

A. No, I don't know anything about it; I have never been in them.

Q. The 702 working on the 700 Black Rock at station 751, will you again be good enough to describe exactly what you saw there in the face of working 702 on the easterly side of 701 crosscut?

A. On the easterly side I saw a seam of quartz on my left
1380 as I faced east of six inches or so, nearly vertical, tight, and a foot or two away I saw about an inch of gouge seam, also nearly vertical.

Q. You say that is tight; what do you mean by that?

A. That there is no gouge accompanying the quartz and that there is nothing between the quartz and granite in the nature of a slip.

Q. That is a working which is open for inspection today?

A. That face is, yes.

Q. Open to inspection.

A. Yes.

Q. How wide is what you would term the vein there at that face, Mr. Burch?

A. I don't know whether I would term it a vein. There is a quartz seam there and I might go farther than the quartz seam in determining the size of the vein. I think I would, if there is a little alteration of the granite alongside of it.

Q. I notice on your exhibit 70 you also have neglected to put the geology upon the Elm Orlu?

A. I didn't make those exhibits.

Q. You don't want to be responsible for that?

A. But with reference to that I would say that it is possible that a considerable portion of these stopes are not now accessible; and I can tell by referring to my notes whether they are or not.

1381 Q. Have you shown all the workings there on your map on the Elm Orlu in this level?

A. I beg your pardon?

Q. Have you shown all the workings on the Elm Orlu 900 on exhibit 70?

A. I don't know. I will look at my notes and see what I can find out about it—you are referring to defendant's exhibit 70?

Q. Yes.

A. That is not on the 900 Elm Orlu.

Q. Is it marked 900 Elm Orlu?

A. No, no, 900, eighth floor.

Q. You only *tended* to represent the stope there?

A. I imagine that is what the intention was to represent.

Q. And the geology is not on it?

A. It certainly is not on it.

Q. Mr. Burch, you referred to the trench "A" at the west end of the Elm Orlu and described the character of the Rainbow vein as it crosses that line of surface?

A. I did not.

Q. Didn't you?

A. No, I never saw the trench.

Q. This trench at the west end line?

A. No, I never saw it.

Q. I misunderstood your testimony?

A. What I referred to was the crosscuts from the tunnel directly underneath that trench.

1382 Q. And you want the court to understand that the vein there was similar to what you term the vein in the crosscut, the mill tunnel crosscut?

A. Very similar.

Q. And you consider that it represented the same character of mineralization?

A. I think so.

Q. At approximately the same degree?

A. I think so.

Q. Do you wish the court to understand that from the southerly wall of what the plaintiffs have called the Jersey Blue upon the 1700 foot level to the face of the crosscut as it was at the time of your visit, but one vein was disclosed?

A. I would think—yes, that is all, a part of a vein, one main vein, which you will undoubtedly cut with that working as you go on. You might say it is the little spurs that I have referred to as making out to the southeast from the massive bodies of ore.

Q. You wish to be understood that it is all mineralized from that south wall to the face, at the time you examined it, that you would call it a part—all of it a part of the vein?

A. Yes, with this qualification that I would call it that part of the vein which we found as a fissure running along the southerly end of the productive part of the vein, throughout its entire extent and is made up of seams of manganese and quartz that diverge from the main vein. Sometimes they have altered granite in between

1383 them and sometimes they have fresh granite in between them. In these particular instances they have mostly fresh granite.

Q. Between what we have called the Jersey Blue and the interlaced manganese in what we call the Rainbow?

A. Yes, I think so.

Q. Fresh granite?

A. It is fresh granite with seams of quartz in it.

Q. That is the branch that was four feet thick when you started and some fifteen feet beyond was five or six feet and which you thought was dying out?

A. That I thought was dying out?

Q. Yes.

A. Didn't show any signs of dying yet, but it is one of those things that do go out into the country rock and die out eventually.

Q. From what observation that you made of the 1700 foot level do you believe it would die out shortly?

A. It is going the proper course to be one of those same things that we find everywhere.

Q. And what is that course?

A. South 67° east, started with, and turned around to south 75° east in the face.

Q. And these fissures that course northwesterly and southeasterly in your judgment have the correct course to die out?

A. Most of them; some of them continue.

1384 Q. Mr. Burch, from your own notes—did you get the course of this gouge on 1406?

A. Yes.

Q. Or was that caved when you were there?

A. Oh, no, it wasn't caved; it was in very good condition—no, I think I didn't in the 1406—1416—no, I didn't get it in the 1406 at all.

Q. Did you get the crossing of this gouge in the 1416 at the point it is represented on exhibit 82?

A. I did. Apparently it is not exactly as represented; it is within three or four feet.

Q. Where would you put it, three or four feet southerly?

A. I get it three or four feet farther south.

Q. Just put a pencil mark on there?

A. Yes, sir, when I measured it. It is farther than three or four feet, about eight feet.

Q. From the point where you got that crossing to working 1406 where that gouge is shown on exhibit 82, will you give me the course?

A. In the center of 1406 or either side or both?

Q. From the center.

A. Well, it is about north 88° east.

Q. Mr. Burch, just returning for a moment—the Deadwood was not stoped any place southeast of the Black Rock fault?

A. I think so, but where it was stoped the stoping is connected absolutely with the other vein so you can't tell which is which.

1385 Q. It is stoped on the Rainbow?
A. Yes.

Mr. Dickson: What you call the Rainbow?
Mr. Gray: Yes, I don't ask Mr. Burch to be bound by that.

A. Well, practically all the stopes in the vicinity of the Deadwood vein which are south of the point where it is cut off by the first strand of the Black Rock fault are on the Black Rock vein and connected intimately with the Deadwood.

Q. Did you see any ore bodies in the Deadwood south of the Black Rock fault?

A. Not that I could identify as being in the Deadwood, no.

Q. So it is difficult to identify there?

A. I don't think it is difficult to identify at the time of the stoping being done, but I wasn't there when it was done.

Q. It is difficult to identify now?

A. It is.

Q. Is there any place where it is easily identified there, which you saw?

A. There is one place; there is one place I identified it.

Q. How about crosscut 1115?

A. Never been in it; couldn't get in it. Starting from the 900 and going down, I will pick out the place—yes, at the point on defendant's exhibit 74, just easterly from station 145, that working was being freshly retimbered in August, when I first went
1386 through the mine and I visited it once or twice since, and there what I conceived to be the Deadwood vein is shown quite plainly going off to the southeasterly in that wall.

Q. Represented with approximate correctness on this exhibit 74?

A. I think it is approximately correct?

Q. Will you now just describe that as you saw it at that point, from your notes, Mr. Burch?

A. My notes show one inch of gouge on the south side of the vein, the gouge dipping—I mean on the north side of the vein—the gouge dipping 59° northeastward; the strike of the vein being north 60° west; the width of the vein being about as shown here, about six or seven feet.

Q. Is that the only gouge you found there?

A. That is the only one that I found in that place, yes.

Q. Was that commercial ore in the Deadwood vein?

A. I think so, yes; it looked like it.

Q. It came right up against the large ore body of the northeast——

A. Not at that point, no; there was no stoping at that point in the working going from station 145 westward. That is only just simply a drift. It is in mineralized granite but not stopeable ore.

Q. And you say you think in this northwest fracture at this place there is ore?

1387 A. That is what I would consider probably commercial ore; it has quartz with a great deal of zinc in it but not a clean zinc ore by any means.

Q. In answer to a question yesterday you stated that one reason in your judgment why what we claim to be the Jersey Blue on the 1700 foot level is not the Jersey Blue is that projecting it up on the dip which it had upon a level 200 feet higher, was it——

A. I said the 160, but I think it is 200.

Q. All right—that it would fall to the north of the face of the working?

A. Yes, a long ways—well, quite a distance.

Q. Twenty-five feet, I believe you said?

A. Yes, but I made a mistake of forty feet in the elevation.

Q. So it would be a little over 25 or 30 feet?

A. Yes.

Q. Now, just take the Rainbow vein as it is shown from the Black Rock shaft on the 1600 foot level of the Black Rock and project that westerly and let us see where it would be cut—take the northerly strand first—now, will you take the middle strand that is shown there—would that have been cut had it been continued westerly in the same way?

A. Yes, I think so.

Q. It would have been cut on that crosscut long before it reached its present face, wouldn't it?

A. Yes.

1388 Q. And the southerly one, that would have been too?

A. Yes, very likely they are.

Q. Slightly cut?

A. Yes, I think likely this strand would become more purely mineralized.

Q. And on the 1600 foot level how are they dipping?

A. I don't know. I have never seen the 1600 foot level. May I explain that, Mr. Gray?

Q. If you wish; I have no objection to your explanation?

A. In my opinion what you call the Jersey Blue and what you call the Rainbow and what we call the Black Rock are all one and the same on the 1700 foot level of the Elm Orlu. Consequently we would expect to find a part of the Black Rock extending there to the point where you find the mineralization. The fact that the mineralization is not stronger there does not prove that it is not a part of the main Black Rock.

Q. Nor the fact that there is some twenty feet of fresh granite between them does not prove anything to your mind?

A. I would have to be shown that it is a fact. There is fresh granite there, plenty of it, but lots of quartz seams cut through it.

Q. In reference to this theory that you have presented to the effect that the Elm Orlu vein in the Elm Orlu property

1389 continues on downward within the Elm Orlu claim and that for only a short distance where the ore bodies are large does it connect with or unite with the so-called Black Rock vein—you have spoken of the Elm Orlu fissure as continuing on downward to what is known as the Bruce—just describe the Elm Orlu fissure as you desire yourself to be understood.

A. The Elm Orlu fissure, as I desire myself to be understood, is

one of the branches of what you term the Rainbow lode when the several branches come close together and is followed in general by one of the strands of the Black Rock fault southwesterly. It is the same fissure that is exposed in the workings immediately underneath the west end line of the Elm Orlu claim as displayed upon plaintiff's exhibit 4 and the same fissure which is shown running easterly, slightly north of east, from there and crossing over the southern side line of the Black Rock claim.

Q. It has, according to your testimony, a well defined north wall?

A. When did I testify to that?

Q. Well, hasn't it?

A. In places it has, whenever a strand of the Black Rock fault happens to conform to the wall.

Q. Then the only definite wall that this fissure has is a strand of the Black Rock fault?

A. That seems to be the case with nearly all of them.

1390 Q. Now, let's just refer to this one, Mr. Burch. Is that correct?

A. Generally speaking I would say that the north wall is defined by a strand of the Black Rock fault throughout the greater portion of its distance, but I have not studied enough of it to be able to say definitely that there may not be at other points some other determining boundary. However, one strand of the Black Rock fault nearly always is either within or on one side of the wall of the fissure.

Q. Either within or on the wall?

A. Either within the vein or on one vein wall.

Q. In what you now are attempting to call the Elm Orlu vein in the Bruce raise, what are the defining features that limit it on the northerly and southerly sides; has it defined walls?

A. I have not seen them beyond the limit of mineralization and so far as I have been able to see in these workings at that point they have not been reached on either side but there is a strand of the Black Rock fault running through that section on both sides of it.

Q. Is that the reason you call it the Elm Orlu vein, because you have the strand of the Black Rock fault there?

A. No, but it is because it is the same strand of the Black Rock fault that follows the main Elm Orlu vein down from the surface as far as I have been able to tell.

1391 Q. You say the limit of mineralization has not been reached there?

A. Not in the workings that I was able to get into.

Q. Do you desire to indicate that the limit of mineralization will represent the walls, and that that is the only wall that this has?

A. That is possible in that case.

Q. Well, I just want to get your opinion, Mr. Burch, as to the wall?

A. Well, my opinion is it is——

Q. Just answer my question first; in your opinion is the limit of mineralization to represent the walls?

A. It might or might not.

Q. In this particular case what is your judgment?

A. I don't know, because I have not been out to the point to find a definite boundary, whether the definite boundary may be marked by a gouge wall or whether it may be marked by a fading out of the mineralization I can't tell. I would anticipate either one.

Q. In other words it has not been developed there northerly or southerly to what you would designate as wall?

A. Not at that point.

Q. Has it any place down there beneath this place where you say your main developments from what you choose to term the Black Rock vein go?

A. I could say that it has been rather definitely determined in the case of the cross cut easterly on the 1500 foot level of
1392 the Elm Orlu, in cross cut No. 1513. Referring to plaintiff's Exhibit 23, I am disposed to think that most, if not all of the mineralization shown on the exhibit southerly from station 46 or from a point 10 feet north of station 46, is within the Elm Orlu branch of the Rainbow lode, being the Elm Orlu vein, the Elm Orlu fissure. The deposition of the Black Rock vein on the same level is not absolutely clear, but I think it is about as shown on Plaintiff's Exhibit 23, and about as testified to by Mr. Green in the first part of the trial.

Q. What is the course of the south wall of what you choose to term the Black Rock vein on that level; you say it is correctly delineated on this exhibit 23?

A. It is, I should say, roughly, about north 85 east.

Q. How do you get that course of north 85 east in those workings?

A. By taking the extreme line at the west end of the workings in cross cut 1513, and the 9th floor of the Black Rock 1400 stope as shown to the east; the south wall of that stope and drawing a line through those two points.

Q. You think that fairly represents it as you have seen it?

A. I think it fairly represents it as I understand it.

Q. Have those stopes of the Black Rock reached the limit of mineralization on the 9th floor of the 1400?

A. They have on the south side—well, they have reached a wall there; in that case there is a rather definite boundary on the
1393 south side, which is a strand of the Black Rock fault; they have reached a rather definite boundary there.

Q. Where is the north wall now of what you choose to term the Elm Orlu vein, and for what extent along its strike is it developed?

A. I don't know where that wall would be exactly in cross cut 1509, because the cross cut is caved just beyond the point where the Bruce raise starts up, near where the green line crosses 1509 on Plaintiff's Exhibit 23. There is probably some mineralization and some definition of a wall beyond that, which I have not been able to see, southerly.

Q. 1511, you might give us a north wall there.

A. In 1511 I should say the north wall is within a very few feet of—say 10 or 15 feet northerly from the green line shown on Plaintiff's Exhibit 23 as crossing 1511.

Q. And its course as shown in that cross cut is what?

A. Oh, there is no definite wall there; it is a case of fading out of the mineralization, where you cannot get a definite wall.

Q. So again you desire the limit of mineralization shall be considered the wall of the vein?

A. Where there is no definite wall, yes.

Q. And the northerly wall is not found any place else except in this one cross cut that you know of?

A. On that level?

1394 Q. Well, on any level?

A. No, not where I have been able to observe it. Take it on the next level above, the 1400, and there they have developed zinc ore 15 or 20 feet wide, and have not reached its limit either way.

Q. What is the character of the material between 10 feet north of station 49 and station 47 in cross cut 1513?

A. For a short distance southerly from station 47 it is rather fresh—quite fresh granite for perhaps 20 feet, with practically no mineralization in it. Then you get into gradually increasingly altered granite as you go southerly toward station 46, and with more seams of quartz in it, and really on that cross cut the two veins approach each other so closely that you can hardly draw a line and say that one is the north wall of one vein and the other is the south wall of the other, but I believe the conditions represented on Plaintiff's Exhibit 23 are very nearly correct.

Q. Now, where is the south wall of this so-called vein located?

A. In cross cut 1511, the southerly limit of mineralization shown on Plaintiff's Exhibit 23, I believe, is fairly correct, and I would be disposed to include all of the mineralization shown in that cross cut on Plaintiff's Exhibit 23 as being a part of the Elm Orlu vein at that point.

Q. What is the course of that southerly wall as you fix it?

1395 A. I don't know. There is too small an amount of exposure; it is not anything that comes up against a definite slip.

Q. Now, go on with the other one?

A. In 1509 the southerly limit of mineralization is very close to the south side of the Bruce raise, which is shown about opposite station 28 on Plaintiff's Exhibit 23.

Q. Do you find the fault in cross cut 1511 which is disclosed on Exhibit 23?

A. Yes.

Q. And it throws that mineralization that is there about as shown in your judgment?

A. Which fault do you refer to?

Q. The one here, the violet or blue colored one.

A. I don't know about that; I will look at my notes. Yes, I have a fault in substantially that same position, but it appears to be in the midst of mineralization. Its course is north 70 west and it dips 77 degrees to the north. Then I have two more a little further south from there in the same cross cut, one about 40 feet south which

has a course of north 33 west and dips 72 degrees to the northeast, and another 10 feet south of that——

By Mr. Dickson: Will you state whether that is shown on defendant's exhibits?

A. No, it is not. Another one ten feet south of that which has a course of north 58 west and is vertical.

1396 By Mr. Gray: What becomes, in your judgment, down there, of all this horsetail structure that you have been following down here and which you show in such elaborate detail on Exhibit 78?

A. I think I referred to Plaintiff's Exhibit 23.

Q. No, let us refer to Defendant's Exhibit 78 and to Defendant's Exhibit 81. These very well show the difference in the use of red paint by the geologists.

A. Well, the same courses and directions are shown on Plaintiff's Exhibit 23, or substantially so, in these cross cuts. Here is 1511.

Q. Yes, but what I am wondering at is how you justify the extension of this hor-etail structure through the red lines here for a hundred feet or more through undeveloped ground on section 78, but when you come to where you have spoken of this Elm Orlu vein on the Elm Orlu 1500, your horsetail structure disappears?

A. I will tell you all that I know about it. There is one cross cut here, 1509, which is shown on this exhibit, which I did not make, as in barren granite, from near the Bruce raise to very near its northern face. Now, whoever made or directed the making of that exhibit undoubtedly knew what was in that cross cut, and I don't.

Q. Now, he must have known, apparently, that there was some of this structure in the northerly end of that cross cut 1509?

A. Yes.

Q. Could you explain why he did not extend that on

1397 northwesterly and southeasterly, the way he extended those lines through ground that there was not any cross cut in on Exhibit 78?

A. Yes, there are some fairly good reasons for that. You take it immediately above the plan shown on Defendant's Exhibit 78, in the territory you refer to and that you have asked me about, and you will find on the 1300 foot level of the Elm Orlu the ground rather well developed by cross cuts and drifts immediately over it, and only about 40 feet above, but that is not true with reference to the territory below.

Q. And that is the only reason you know of?

A. That is the only reason I know of, yes, sir.

Q. Mr. Burch, will you come over to the block model which is simply a representation of various sections, and taking section 21 will you indicate where the Elm Orlu vein—the so-called Elm Orlu vein that you have been recently describing—has its foot and hanging wall on the 1300 Elm Orlu?

A. The south wall, do you want?

Q. Well, either—give the south and the north.

A. It is a little indefinite on that level. I will say that it is sub-

stantially where the blue line indicating the Black Rock fault or a strand of the Black Rock fault, crosses the working 1316. That working is pretty badly caved for four or five sets right through at the point where the fault crosses and there is undoubtedly some mineralization extending out beyond the fault proper and
1398 there is rather a distinct band of quartz crossing near the face of this working so that you can hardly say there is a definite boundary, but approximately at the point where the blue line crosses it.

Q. And on that section give me the northern boundary of it as it is shown upon your exhibit, portrayed upon your cross section?

A. The northern boundary of the Elm Orlu proper can not be determined in that mixture of fissure that goes out from the Black Rock and goes out from the Elm Orlu and merges in a great mass of vein. Just where to draw the boundary between the Elm Orlu vein in that mass of ore and the Black Rock vein in that mass of ore is impossible to tell.

Q. What is this you have marked "Black Rock vein" upon this exhibit 77?

A. That is the same that you have marked "Jersey Blue vein" upon the corresponding exhibit.

Q. Now, where are the walls limiting that vein on your exhibit 77; aren't they portrayed with approximate correctness upon this exhibit?

A. Yes, I would say so although a considerable portion of them as you will observe is projected from workings above or below the last working to the west in the raise which shows on section 23 and there is no corresponding working at all on section 21.

Mr. Dickson: Section lines 23 and 21?

A. Section lines, yes.

Mr. Gray: Why is it, Mr. Burch, that you are unwilling to carry this north wall of what you are now terming the Elm Orlu
1399 vein up to this gouge slip that is shown right along the south line of the Black Rock?

A. Because I can't tell what portion of that mineralization is referable to fissures that come out from the Black Rock vein and the fissures which come out from the Elm Orlu vein.

Q. Well, you have a distinct gouge there on the north wall, haven't you?

A. We have a distinct gouge of a fissure which connects ultimately with the Black Rock vein, known as the Creden vein.

Q. Just trace that gouge on the map so his honor will be able to see it?

A. Running as I carry my pointer out along working 1320 to the northwesterly face of 1320.

Q. What does the geologist mean who portrayed the lode cutting through here just south of what you call the Creden vein and across working- 1305 and 1318?

A. There is such a gouge there.

Q. Why don't you recognize that then as the north wall of this vein on that level?

A. I would no more think of recognizing that as the north wall of the vein upon section 21 than I would of the interior gouge on section 31 or the two interior gouges within the limits of the vein.

Q. In cross cut 1303 do you show any vein material north of that gouge?

A. No, sir.

1400 Q. Why then won't you consider it as a bounding gouge at that place?

A. At that place it might be so considered.

Q. All right. Now, this Creden vein that you have referred to, what is the width of that fissure or fracture?

A. Well, where I have had an opportunity of observing it, it ranges from three or four or five feet to perhaps as much as 12 or 15 feet.

Q. And it extends in a sort of upward direction from the large ore body which we have called the Rainbow, up to what you call the Black Rock vein?

A. Yes, or you can reverse it, and say that it extends downward as a part of the Black Rock vein into the large ore body.

Q. Let us go again to section 21. If that the Creden shown upon your section 21—is it shown with approximate correctness on your Block model?

A. I think so, but there is a great deal of that which I have not been through. I have only seen it where cut on the levels. I have not been able to go through the stopes upward nor the raise upward.

Q. On Section 21 I notice this gouge extending on the Elm Orlu 1200; where would you call the north wall of the Elm Orlu vein as you have chosen to call it?

A. On the Elm Orlu 1200?

Q. Yes.

A. I will look at my notes.

1401 Q. Let us look at the model first.

A. I did not make the model.

Q. You don't care to vouch for it?

A. I think that the model is in general correct, but there may be some little details in which I would differ.

Q. You have been referring to these sections as approximately correct, haven't you?

A. I think they are approximately correct, but I want to see the detail of that gouge.

Q. All right. On the Elm Orlu 1200 on Section 21. Won't you give me the map of the Elm Orlu 1200.

A. On the Elm Orlu 1200 on Section 21 I find no marking of the point that I would designate as the wall of the Elm Orlu vein. A short distance east of that I find a gouge which seems to limit the mineralization, and projected eastward would cross the section in about the position shown by the gouge on Section 21 of the Block model, and I therefore believe that on the Elm Orlu 1200 the gouge shown on Section 21 of the Block model bounding the red vein matter is the north wall of the Elm Orlu vein.

Q. Now, then, as portrayed upon it, you follow that same gouge right down to the Elm Orlu 1300; why is it that you are not willing to take the same gouge on the 1300 as the bounding wall?

A. Well, I have not followed that, consequently I don't
1402 know. I notice the stope, however, extends on above that level.

Q. And that stope is projected on the plane of the model, so that is the occasion for that?

A. I believe that is true, yes.

Q. Is the Creden vein shown with approximate correctness on that section?

A. I think so, but there is a great deal of the Creden that I have not been in. I have not been in the stopes upon the Creden, nor in the raise upon the Creden.

Q. But the Black Rock is shown approximately correctly?

A. I think so.

Q. Now, the Black Rock on the Elm Orlu 1300, couldn't you indicate the southerly wall of that?

A. On Section 21, no; I would have difficulty in doing that.

Q. It is shown with approximate correctness on the section, isn't it?

A. It depends entirely on what you take for the wall.

Q. What would you take for it?

A. The south wall of the Creden, which is a fissure apparently clearly connected with the Black Rock, might be considered as the south wall of the vein down to the point where it merges with the fissures coming off from the Elm Orlu vein. Then to draw a
1403 line through that mass of mineralization and say which part of it was the result of the fissuring from one vein and which part of it was the result of the fissuring from another vein would take I should say a year's study at least.

Q. I understood from some of the professors that this fissuring was all formed at the same time?

A. That is true.

Q. Then why wouldn't you consider the Creden wall the wall of the vein?

A. If we find fissures crossing as my fingers are crossed, it would be difficult to say whether a chunk of ore between my index and second fingers was connected with the fissures represented by the fingers of my left hand or the fissures represented by the fingers of my right hand.

Q. I was getting at your opinion. You have indicated that the Creden might be the southern boundary of the Jersey Blue or Black Rock vein?

A. Down to the point where it merges with the mineralization that runs across from one wall to the other.

Q. Why do you consider it more the one wall of the Jersey Blue than the other wall of what you term the Elm Orlu?

A. Because in that work it appears to connect with what you call the Jersey Blue and what I call the Black Rock.

Q. All right. Well, between them is a substantial area of unmineralized granite, isn't there?

1404 A. There certainly is.

Q. You wouldn't consider that all, on the Elm Orlu 1200 and from the 1300 up to the 1200, that unmineralized granite, all part of the Jersey Blue vein?

A. Not without more exploration of it anyway.

Q. The exploration is not sufficient. Why is it that you show on these model sections the copper vein coming down almost vertical and striking northeasterly?

A. I don't know that they do.

Q. Well, just follow it on from section 21 on to the plane at the bottom, which represents the 1400?

A. This is the copper vein here, but I think it is the projection of it on the floor of that level.

Q. Don't your two lines — follow right over northeasterly indicate it?

A. The line that follows over northeasterly is the line of the Black Rock fault. The Black Rock fault is later than the copper vein, presumably, and this dotted red line on the floor running across between section 23 and 25 is intended, as I understand it, to represent the continuation of that copper vein on the south side of the Black Rock fault.

Q. Now, coming back to the question—on section 21,—you will concede, Mr. Burch, as it is portrayed here that the two blue lines representing the two walls of a copper vein on section 21, are continuous northeasterly on the plane representing the 1400?

1405 A. It does not convey that impression to my mind but it might to yours. I don't know.

Q. On the 1200 Elm Orlu, where is the south wall of the Jersey Blue on section 23?

A. On the 1200 Elm Orlu?

Q. Yes, sir; as portrayed on your section?

A. Well——

Q. That is the section that goes up to the Jersey Blue or Clark or wet raise, isn't it?

A. Yes, that is the one.

Q. Now, where is the southern wall of this Jersey Blue portrayed on that level?

A. Well, if you consider the Creden as a part of it, and I am bound to do so, it would be substantially where my pointer is, on that blue line.

Q. That is over here on this other raise which is projected, apparently, on to the plane of the section?

A. Yes, sir, somewhere in there.

Q. What raise is that?

A. That, I think, is the Winchell raise.

Q. What do you call the material between the Clark or wet raise and this point that you have indicated?

A. It is a very large horse of granite—it is granite, I know that.

Q. And you would call that all a part of the Jersey Blue vein?

A. I would say that is included between two downward branches of the Black Rock vein, one going down to the south and the
1406 main one continuing on down. So far as the main one is concerned, the south boundary of that is within twelve or fifteen feet of the north boundary.

Q. Now, if you will just come over to the map and put your initial "B" on the south boundary of what you desire to be understo-d as denominating the Black Rock vein in the Elm Orlu 1200 foot level?

A. Supposing I put down "B" and "B-1."

Q. All right; anything you wish. That is on section 23 of defendant's exhibit 86?

A. One indicating the main vein—the first one indicating the limit of downward branching, the second one the main fissure.

Q. As a matter of fact exhibit- 77 and 78 represent as you believe correctly the Black Rock or Jersey Blue vein upon these levels?

A. I would say approximately so. I have not compared all the details that are shown here, but I think it is approximately correct.

Q. That is the northern vein that is shown in some instances, except as you have connected it by that Creden branch?

A. And all the other cross fissures.

Q. What are these cross fissures that you refer to?

A. There are numbers of them shown on crosscut 1307 continued and in 1305.

Q. Is there any distinction sought to be drawn upon these
1407 two plan maps by having the Black Rock vein written just north or above the small narrow vein, which we have called the Jersey Blue, on exhibit 77, and putting it in between the Jersey Blue and the large ore body on exhibit 78; or was that just one of the accidents of map making?

A. I think that is probably one of the accidents of map making. I think probably they both indicate the same thing.

Q. Mr. Burch, what is the course of this gouge that is shown in the working 4 from the Clark tunnel?

A. My notes simply indicate that it is substantially the same course as the working.

Q. That would be approximately northwest?

A. About north 60° west, I should say.

Q. Extend that upon its course, it is not unreasonable to correlate it with the gouge which you saw on working 25?

A. The trouble is if you extend that on its course which is——

Q. Now, just do it the way I suggest once?

A. It would look unreasonable.

Q. Just do it the way I suggest and see what you think about it?

A. It looks as though it was pointed toward that, but the one in 25 that is not pointed toward——

Q. What is the dip of this in 4?

A. As shown 83° to the north.

Q. The course of it is about north 60?

1408 A. Approximately north 60° west.

Q. Is that the one you tried to correlate with the Pyle?

A. That is the one I said was most likely to be the upward extension of the Pyle but I did not claim that it was.

Q. Have to have a change in its dip, wouldn't it?

A. It would have to change.

Q. And a change in course?

A. Very little change in course but it would have to take a change in dip of——

Q. Look at the model?

A. Twelve degrees.

Q. Won't you point that out on the model?

A. Yes, sir, I will.

Q. Coursing in this direction?

A. Very similar in dip to what is seen on 451—I mean in strike.

Q. These are the only things about it on which you correlate it, the similarity of strike?

A. Well, it is a similar fissure in appearance and there don't seem to be anything else out there that corresponds—that comes anywhere near fitting it.

Q. How many feet do you have to carry it over to get into the working connected with this 25?

A. You would have to carry it over about 115 feet.

Q. How much on the strike would you have to alter it to correlate it with the Pyle?

1409 A. On strike?

Q. On strike.

A. On strike?

Q. Yes, on strike, as you see it?

A. Practically none on strike.

Q. Would you correlate—to correlate it with the Pyle where you said you had last seen the Pyle?

A. Here.

Q. How much on the dip?

A. About 360 feet.

Q. I presume, Mr. Burch, when you gave that testimony, you felt that that was not an unreasonable projection?

A. Yes, I would consider it an unreasonable projection, to testify as to the absolute continuity of a vein; I wouldn't consider it unreasonable for the purpose of showing that it is a probability.

Q. Or expressing an opinion that it is probable, too?

A. I didn't express such an opinion.

Q. You would not be willing to assume that it is possible?

A. I think that is one of the two possibilities, probably the most probable one.

Q. What is the course of the Pyle at the place where you were attempting to correlate it here on this 455 working?

A. North 70° west.

1410 Q. Did you go into that raise just above the 500 foot level of the Elm Orlu Pyle?

A. I did, yes.

Q. Did you take the dip of that gouge two sets above the level?

A. Two sets above the 500 foot level?

Q. Yes.

A. I didn't see any gouge.
Q. In the raise you put up just above the 500, didn't you go up?
A. Yes, I have got that.
Q. What is the dip of it there, Mr. Burch?
A. 68° to the south.
Q. What did you give the course of this slip that you said might be the Pyle in the 500-Elm Orlu?
A. I didn't give it in the 500. It is substantially as shown—what I gave is the one on the 450.
Q. 455 on the model?
A. 455 is the 450 foot level.
Q. All right, what is the dip on that level?
A. The dip is about 72° south on that level.
Q. On the 455 foot level?
A. Yes.
Q. You didn't give the course?
A. No.
Q. What is the course?
A. The course is substantially as shown by the blue line on the working 508—I think that is the number of it—defendant's
1411 exhibit 101. It is not a straight line. It curves around more to the south as it goes to the west. At the raise its course I would say is about north 70° west, but as it goes westward it becomes more nearly east and west.

Redirect examination.

By Mr. Dickson:

Q. I will ask you, Mr. Burch, to what extent, if at all, if you were thoroughly familiar with all the phenomena disclosed in the underground workings of every mine in the Butte district would that familiarity or that knowledge aid you in determining whether or no the Black Rock vein faulted the Rainbow lode on defendant's exhibit 65 in the vicinity of the workings marked 25 or on the 450 foot level in the 456 drift or in the 700 or 800 level, wherever it is, in the 702 drift?
A. No, I couldn't see where it would aid me.
Q. Would it be any aid at all?
A. No.
Q. Whether they so crossed or not would be determinable by what was observable at the alleged or contested point of crossing, would it not?
A. It would.
Q. You were asked about the absence or the number of stopes on the Black Rock from the surface down to the 1000 foot level? You pointed out one in the Black Rock tunnel I believe and you pointed to one on the model, defendant's exhibit 101 in the bottom
1412 of which stope are found the figures 704. That is on what level?
A. I did not point to that as being a continuation of the Black Rock vein.
Q. What point did you point to as the Black Rock vein?

A. Above 1012 drift of the Black Rock mine, and one above 1011 drift or cross cut from the Elm Orlu; that is one part into which I have not gone, but I have seen the lower opening of the stoping which is under the 1000.

Q. They are the stopes to the northeast of which you have already testified?

A. Yes.

Q. As you went through the Black Rock mine did you make any observation with a view to forming a judgment as to whether or not there was merchantable ore there which was yet unstoped in places?

A. Yes.

Q. Did you find such places?

A. I did.

Q. Now, calling your attention to the model, Exhibit 101, in this respect I think it corresponds exactly with the model on the other side—I will ask you to point out to the court where, of the stoping that is done on what is called the Rainbow lode by my friends on the other side, from the surface down to the 1000 foot level, between cross cut- 1008 and 1010 as shown on the model on the 1000
1413 foot level and then easterly for about 500 feet—scale off 500 feet from cross cut- 1008 and 1010 and give us on the 1000 foot level the first stoping found easterly thereon on the Rainbow lode?

A. There is one stope.

Q. Give me the distance?

A. I thought you said to scale off 500 feet easterly from these cross cuts. The 500 foot point comes here.

Q. In that 500 feet point to the court where that stoping that is found from the surface down to the 1000 foot level is found, all of it?

A. There is one stope shown above the 704 drift of the Black Rock, and within that 500 feet the ends of several stopes further down project over into it.

Q. Down to the 1000 foot level I said?

A. The end of the stope between the 1000 foot level and the 900 foot level of the Black Rock projects a short distance within that 500 feet.

Q. About how far within it?

A. Oh, about 50 feet.

Q. Referring to Plaintiff's Exhibit 23, of the 1500 Elm Orlu, will you point out where the Bruce raise is indicated upon that plan?

A. It is shown in cross cut 1509 about opposite station 28.

Q. Does that Bruce raise in your judgment go down upon the same southerly branch of the Rainbow lode so called and is
1414 found in cross cut 1511, upon the same exhibit, between stations 46 and 44?

A. I think so, yes.

Q. If that branch of the vein, the so-called Rainbow vein upon which the Bruce raise is driven upward, extended to the 1700 foot level of the Elm Orlu, where, from all the data you have before you, would you say it would be found on the 1700, with reference to the northern cross cut going out from the Elm Orlu shaft?

A. Oh, it would be found southerly of that.
Q. About how far southerly?
A. It would probably be found 50 or 60 feet south of the shaft.
Q. South of the Elm Orlu shaft on the 1700 cross cut?
A. Yes.
Q. That southerly branch of the Elm Orlu Rainbow lode down through which this Bruce raise goes, your honor will observe, it is a long ways southerly from the flat dipping portion that comes over and connects with the Black Rock.

The Court: I thought you asked him where the raise would be found.

Mr. Dickson: No, but if the southerly branch of the Rainbow lode through which, as far as it goes, the Bruce has been extended, if that same branch of the vein did extend downward to the 1700 foot level of the Elm Orlu, where would it be found on Plain-
1415 tiff's Exhibit 23 with reference to the Elm Orlu shaft shown on that exhibit?

A. I have answered that; it would be southerly of that shaft.
Q. Referring to the Mill tunnel level, Defendant's Exhibit 66, and calling your attention to a piece of work running in a northwesterly direction as shown on that exhibit from station 1118, it starts out about station 1119 I think—in that connection you said that where you believe that same vein was taken up again easterly of the little slip shown there, that there was a difference in the mineralization; what did you mean by that?
A. A difference in the intensity of the mineralization on opposite sides of that slip. My only reason for saying that is that on one side apparently there is a stope and on the other side the ore is not sufficiently good to stope.
Q. Oh, that is what you mean. Up to that little slip the vein was big enough to stope, and was stoped?
A. Yes.
Q. Your attention was called on cross-examination to Exhibit 84, on which there was shown three strands of ore, one having immediately over it the figures 1604 at one end and 1607 at the other end, the middle one having the figures over it 1602 and 1603 and the most southerly one having the figures 1605 over it, and under it 1608, and you were asked to lay your pointer on those and see, if they were continued in their own directions, if they ought
1416 not to be found in that part of 1701 cross cut running northeasterly from the Elm Orlu shaft from its face back for a distance I should judge by looking at the map of 60 feet or such a matter, and I understood you to say that they would be about in that line?
A. Yes.
Q. Are those three strands, one or all of them, in your judgment on the north dipping branch of the Elm Orlu vein that starts on quite a flat dip on the 1200 level across to a junction with the Black Rock vein?
A. I cannot see it that way, no; I think they are on the main Elm Orlu-Black Rock vein, but I have never seen them.

Q. You have never seen those three strands?

A. No, I have never seen them; I simply know them by projection, that is all.

Q. Very well, I won't ask you any questions about them. On cross-examination you were interrogated with reference to the horsetails or cross fissures shown upon the 1200 Black Rock, Defendant's Exhibit 78, and the absence of work on that level to enable you to say that they represented the exact condition. How far above that level, in this immediate section, vertically above it, did you have stoping and workings cutting that whole intervening country?

A. About 40 feet.

Q. Have you any map showing that?

1417 A. Yes; on the 1300 Elm Orlu.

Q. Which would be how many feet above the Black Rock?

A. About 40 feet on Defendant's Exhibit 77.

Q. Point out the workings in that area shown upon Defendant's Exhibit 77?

A. There is working- 1302, 1316, a portion of 1306 I have been in, 1303, 1305, 1313, 1315, 1307, 1312, and the sill floor of the stope extending through from 1305 to 1307 along the lines practically, the claim lines.

Recross-examination.

By Mr. Gray:

Q. About how far south of the shaft of the Elm Orlu do you think this so called Elm Orlu vein would be on the 1700?

A. In my judgment it would be probably 50 or 60 feet. It shows a tendency, as it goes westward, to go more nearly west than southwest, as it is eastward.

Q. That would be giving it a course of what from the Bruce raise?

A. I don't know.

Q. Well, look at the model or any map that you have?

A. Suppose we find the Bruce raise.

Q. Here it is on the model on the 1500, and here is the Elm Orlu shaft.

A. That would be an average course, judging by the eye,

1418 of about south 70 west, which would make it 50 or 60 feet south of the shaft.

Q. Won't you explain to his honor why that is not developed on the 1600 Elm Orlu?

A. I have never been on the 1600 Elm Orlu.

Q. If it went where you say it went, this working should have shown it, shouldn't it?

A. I imagine probably that it crosses where the green line is shown on Plaintiff's Exhibit 25; that would be about the right position for it, but I have not seen it there.

Q. You think that would be about where it ought to be?

A. Yes.

Q. Well, how wide did you say it was there in that 1511 cross cut?
A. In the neighborhood of 125 feet, or a hundred feet.
Q. It is wide enough so a man ought to be able to see it if he was walking through these 1600 workings of the Elm Orlu?
A. If it maintained any such widths, yes, but in 1509 I am reasonably certain that it is not one quarter of that width; and that is only a short distance away.
Q. It seems rather an irregular mineralization?
A. Yes, like the remainder of the Rainbow lode.
Q. You are acquainted with the 1700?
A. The 1700 cross cut, yes.
1419 Q. Didn't you go into the drift?
A. I did not.
Q. You have not been looking for that vein below the Bruce raise or you have not gone into the workings that might disclose it?
A. No, I have not had time to go over everything.

Mr. Dickson: The calculation would take some time, but we think it can be mathematically demonstrated, almost, that this vein would fall south of the shaft, but I will take it up with another witness.

By Mr. Gray:

Q. I understood you to say that in your judgment and acquaintance with all the geological conditions of Butte and with all the other veins here would not assist you in arriving at your conclusions?
A. No, I said in arriving at a certain conclusion; at a conclusion with reference to a certain point; not all my conclusions, no.

(Witness excused.)

Mr. Dickson: There were some questions propounded to Mr. Salisbury at the opening of the cross-examination respecting the report of Mr. Sales covering the Butte district, which, as they were not followed up, I can conceive of no reason why they were propounded, unless it were to carry the inference or implication, or to suggest an inference, that Mr. Sales, who is, I understand, very familiar with this district, is at war with the contention made
1420 by the defendant in this case. If any such inference as that was intended to be suggested, we will say now to the gentlemen upon the other side, so they will have ample time to consider whether they will act upon it, that we will interpose no objection at all if they call Mr. Sales and interrogate him about the conditions in the ground in controversy here and get his opinion about it.

Mr. Gray: I don't know that he has examined this particular ground.

Mr. Dickson: I understand he has.

Mr. Gray: Well, we have no objection to his honor considering that very excellent paper, and reading it while he has the case under advisement.

Mr. Dickson: I have not read it, and of course we would object to that, but we have no objection to the witness.

The Court: As far as any inference of that character which counsel for the defendant thinks has been made, the court will not consider it at all.

Testimony of Walter H. Wiley for Defendant.

WALTER H. WILEY, called as a witness on behalf of the defendant, being first duly sworn, testified as follows:

Direct examination.

By Mr. Dickson:

Q. Your full name?

1421 A. Walter H. Wiley.

Q. And your age?

A. Fifty-three.

Q. Residence?

A. Los Angeles.

Q. Occupation or business?

A. Mining engineer.

Q. Where did you study mining engineering?

A. I began work as a miner, working in the mines thirty-five years ago. In 1883 I graduated from the mining engineering course of the Colorado State School of Mines.

Q. Known as the Golden?

A. It is.

Q. In what year?

A. 1883.

Q. How continuously since then, Mr. Wiley, have you followed your profession, business or occupation of mining engineer?

A. Since then I have been continuously engaged in the business of mining engineer until within the last two years. During the last two years I have devoted a portion of my time to other business.

Q. And a portion of it also to mining engineering?

A. Yes, sir.

Q. How extensively has the pursuit of your profession carried you over the country in an examination of the mines?

1422 A. During that time my work has taken me in many of the mining districts over nearly all the western states, into Alaska, into British Columbia, and the Yukon territory, into a number of the states of Mexico, and to South America and into Asia.

Q. When did you first make an examination of the mines in the Butte district?

A. My first examination in Butte was made about sixteen years ago. Since then I have made a number of trips to Butte and have examined a very considerable number of mines.

Q. In whose employ or what mines did you examine on the occasion of your first visit seventeen years ago?

A. The first mines I examined here were the Pacific and Poulin and the claims surrounding that section, and shortly afterwards the Original, the Stewart, the Colusa Parrot, the Gagnon and a number of other lesser claims.

Q. Did you make an examination of the Anaconda properties or any of them?

A. I have of a very considerable number of the different properties of the Anaconda Company.

Q. When did you first take up your examination of the ground in controversy, the Elm Orlu Black Rock mines?

A. In April of 1914.

1423 Q. And how frequently have you visited the district and carried on an examination of these properties since then?

A. I have been here on four different occasions and spent a total of something over sixty days in the mines.

Q. Underground?

A. Underground.

Q. During these visits and these examinations of the underground workings of the Black Rock and Elm Orlu are you able to say whether or no you examined and inspected all of the accessible openings in both the Black Rock and Elm Orlu workings?

A. I have examined nearly all of the accessible openings.

Q. I will ask you if your examination was directed to an effort to ascertain and for yourself determine the relation of the Black Rock vein to what our friends upon the other side call the Rainbow lode and what we call the Elm Orlu-Black Rock lode?

A. It was. I made an attempt to determine all the facts bearing upon the relation of these different veins.

Q. Now, we will save time by it if you will in your own way state to the court the conclusions at which you have arrived and the basis for every conclusion which you reached, which has any bearing upon the question in your mind as to whether these two veins are of the same or different ages; and whether the so-called Rain-

1424 bow is crosscut or intersected by the Black Rock on its strike or on its downward course or intersection, passing through and beyond the so-called Rainbow lode?

A. On the surface of the Black Rock claim we have a vein which crosses the west end line. This is developed by workings close to the surface entirely across the claim, across the end line and for one hundred feet or more to the west across the Admiral Dewey and Jersey Blue claims. Farther west near Deadwood gulch we have a tunnel called the Gulch tunnel, which runs in and cuts this vein. We have no workings on the surface which follow that vein as far west as is shown upon this map or as far to the west as is shown upon the block model. We have, however, on the 450 level—the 400 level of the Black Rock a long drift running to the west through granite—I have not been clear to the west, only as far as the figure "4" in the name "402"—but I heard the testimony of Mr. Davis saying a thirty foot vein of zinc ore standing nearly vertical was cut by this level. This is considerably farther west than is shown upon the surface. The distance from this point to the farthest west point

where it is cut on the 450 level I think, by the development, where it is shown upon the apex map and the block model, and the distance through from there to the 400 foot level is a little less than 400 feet. The dip of the vein in its upper portion as shown by continuous workings on section 23 for a distance of greater
1425 than 400 feet is about 85° to the south. That dip would allow for a horizontal distance of about forty feet so that assuming a dip near the surface of the ground through the undeveloped territory of forty feet, the width of the vein shows on the surface at the point indicated. That is the basis for showing that. There is this further fact, that in the gulch there is a showing of a vein, a distinct outcrop. It is true that farther west we have a vein in the Jersey Blue.

Q. In the Jersey Blue shaft?

A. In the Jersey Blue claim as shown in the Jersey Blue shaft. This has a direction which, if continued to the southeast, would bring it in somewhere near this vein of the Black Rock as shown. The direction as shown by the shaft is about south 75 degrees east, so that continued towards the east would intersect this directly, and it is a reasonable assumption that the vein as shown in the Jersey Blue shaft continued to the east would reach this place in the same way. As the hill rises the apex would naturally throw back somewhat, although not much, because the vein is nearly vertical. I would not for a minute attempt to project the Jersey Blue vein on the line of the wall plate on that shaft through several hundred feet to the east, but I want simply to explain that I do not know it is not so extended; possibly it is, but probably this branch may turn and go to the Jersey Blue, but at the position as shown on this plan
1426 map, placed on the proper ground work beneath it, the dip of the lode, in connection with the outcrop, is I believe the correct one. This vein continuing towards the east in the Black Rock tunnel has been followed continuously for several hundred feet. It has also been followed continuously by the Black Rock raise downward without a break for nearly 1300 feet. There was one interruption at the 800 level of the Elm Orlu as shown on the cross section and also on the skeleton model where there is no continuity of veins shown, but there has been recently a new raise put through that interval, that portion where the Clark raise left the vein going up, and following to the south has been developed by a new raise which follows upon the Black Rock vein, but now there is absolute continuity from the Black Rock tunnel down to the 1300 foot level of the Black Rock mine, all upon one and the same vein.

Q. That raise that you refer to is denominated upon the plaintiff's exhibit 1 as the Black Rock raise?

A. Yes, it is.

Q. Proceed?

A. Following east upon this vein for a distance of about 500 feet easterly of the west end line of the Black Rock in the Black Rock tunnel we find a connection which has not formerly existed. At that point there is a division of the drift, one running towards the north-

east and the other towards the southeast. I happened to
1427 have been at the mine and made several visits at the time that drift was run. It followed a strong distinct vein of quartz that can be seen in places now six and a half feet in width. At the point about sixty feet east of the division of the drifts this drift encountered a cross slip which ran in a northwesterly direction and which faulted this large body of quartz a few feet to the northwest. This was driven for a distance of about 25 feet and another slip running parallel to the one first met was encountered and this further faulted the vein. This fault was upon what was called—what is called the Deadwood fault or the Deadwood vein as marked upon this map. It is a well known vein and fault extensively developed to the 1000 level of the Black Rock mine and developed on the other levels so that it is altogether probable that the same development at the mouth of the Black Rock tunnel and extending in a southeasterly direction is the same vein and fault. At any rate, this fault interrupted, dislocated this portion of the Black Rock vein which had been followed and which carried a large body of good quartz, carrying some ore. Extending east as this drift was originally driven a different condition was encountered. There is not the large body of quartz which had been followed although there is a distinct strike, much less in width. The conditions easterly of this interruption are complicated by the fact that we not only have the Deadwood vein and fault crossing in a northwesterly direction, but at a short dis-
1428 tance farther east we have a large fault known as the Black Rock fault which came in after the formation of all the veins and has dislocated that in many places. Other workings have since been driven and driven parallel to the most northerly, extending to the east north crosscuts, and a continuous drift curving towards the south, until it encountered the Black Rock fault, so that now the conditions as we see them—generalizing—are that instead of one large body of quartz we have a number of continuous streaks varying in width from—oh, from an inch to a little more than a foot. There are several of these running in an easterly and westerly direction so that through this area, until we reach a point about fifty feet west of the Black Rock main shaft we have a shattered area filled with a number of strikes to the easterly and westerly, striking quartz and an area of altered granite, all of which I believe to be a portion of the lode. Northerly of that we have a very distinct granite but little altered.

Q. Shown on what working?

A. Shown on the crosscut No. 7 running to the north. Of course at this elevation there near the surface all the granite is liable to be somewhat altered by surface action, but there is a very distinct difference, very distinct difference between the granite in the area to the south which is included in the vein and to the north which is in the the north wall. Continuing still farther we encounter a large body of quartz and manganese ore, the manganese near the surface
1429 is oxidized and is black so that it is very distinct, the same manganese which in depth is pink, at this elevation is almost always black. This body has been followed by a drift extending east-

ward until we reach a point substantially at the discovery shaft of the Black Rock mine. At this point a raise has been made to the surface, largely through old workings. What they were, whether originally a discovery shaft or a shaft of any sort I cannot say only that there is old workings and old timbers and it probably, on account of the frequency of the timbers, was more than a shaft; most likely a stope. Still further east a distance of about 40 feet the vein is followed and there in this level we run into the wash, it is so near the surface, so that in order to continue the tracing of this vein to the east we go down a winze 90 feet in depth immediately or nearly immediately under the discovery shaft. This winze takes us down to the working known as the Niagara or Mill tunnel. Before going to that I would like to trace this large body of manganese and quartz which runs in a northeasterly direction. It runs across the north side line of the Black Rock claim.

Q. That large body to which you now point has over it the words "Niagara vein" on defendant's exhibit 65?

A. It is marked "Niagara vein" and the same vein is shown on the surface map extending across the north side line of the Black
1430 Rock claim. A portion of this manganese is developed extending in an easterly direction in the workings of the Niagara tunnel, but there is a very considerable heavy development in the Niagara tunnel, and crossing the north side line of the Black Rock claim. There is the appearance as shown upon that exhibit of two walls, one running easterly and westerly with the Black Rock and the other running a northeasterly direction and crossing the two side lines. This appears to be more so because the more recent Black Rock fault, the main portion of the fault, does come from the south and extends across the north side line and as we go in the gouge anywhere this fault—the most recent appearance is seen, is the plainest. The wall of the fault is probably upon the vein itself. However, I do not consider that these are two crossing veins for the reason that I believe them to be simply branches of one somewhat complex vein. That certainly has become simply one vein. The portion called the Niagara vein which crosses the north side line of the Black Rock is where I now hold my pointer. The side line of the Black Rock is marked on the model by pencil so that at the surface and as developed in the Niagara tunnel, that vein is entirely north and outside of the Black Rock claim, but in its dip downward it comes in—very soon comes in and unites with the eastward trending strand of the Black Rock, and they go down together as one and the same vein. We do not expect—we might expect
1431 and we can trace the Black Rock fault across that area and even it is not entirely plain, there is an apparently slight interruption—we cannot trace one of these veins distinctly through the other any more than we could trace the spokes of a wheel through a hub. There is a certain central area where they are one vein. This condition on what has been called the Rainbow lode appears to be rather the unusual thing. It will be only necessary to look at this, which is plaintiff's exhibit 52—the representation of the Rainbow lode from the Alice claim through the Black Rock claim—to,

see that there are other places where similar conditions appear to prevail; that there might be two crossing lodes, but which could be construed, and I presume properly, as simple branches of one complex lode. Continuing downward through this winze some ninety feet in depth, immediately under the discovery, we reach the Niagara or Mill tunnel. The winze is shown upon this map about 40 feet northeasterly of the Black Rock main shaft. The Niagara tunnel and the mill tunnel are practically about the same level. We can walk from one through to the other. Going out the Niagara tunnel we have developed the Niagara branch, formerly described. Extending easterly from this winze beneath the discovery shaft we follow for a distance of about two hundred feet where we do not see any distinct vein in place for the reason that the drift is driven through old workings. We see the evidences of old timbers
1432 projected on the sides of the drift, and unquestionably the drift follows through a line of old stopings. We do see a little quartz, but I would not want to say for any distance that even any of that is in place. It is a filled or old working. At a distance some 200 feet easterly of this exactly on section 31 we reach a point where we go through this old fill right into granite beyond. At that point there is a slight interruption in the continuity of the vein due, I believe, to a faulting, a slight faulting, which has interfered with the width of the vein but has not interrupted its continuity, although it has faulted it some 20 feet to the northwest. There is the large body of quartz and manganese shown in the drift extending easterly from this crosscut and we find, while we have gone through granite for a little portion of this country rock granite, we again find the large body of manganese and quartz, so that the distance which is actually unexplored through there is less than twenty feet. From there easterly a distance of about 150 feet we follow along through similar ground to that followed from beneath the discovery shaft, that is old workings, old stopes. On the surface immediately over that there is an old stope, and while we do see gouges in place at some points, generally speaking all of this drift up to the point where a shaft is indicated at station 1181 through old workings and old stopes even, we see enough of the walls and all to know that we have been following along a vein worked in
1433 years gone by and having generally the same direction as the drift, extending in an easterly direction nearly parallel with the line of the Black Rock.

At this point where the shaft is marked, which is the shaft testified by Mr. A. B. Clark as the one that he worked, there is a marked change in the vein. We have had a large body of quartz and manganese which is unquestioned good vein. Beyond that point to the east we do not find that large body of quartz. The conditions are changed. We have less quartz, and it is in comparatively small stringers. It has been said that at this point the vein that was followed is faulted to the north, and Mr. Green said that they were driving a cross cut, extending the one shown upon this exhibit to the north, to show that it crossed the northern side line of the Black Rock claim. That drift is shown upon the skeleton model at the point where I now hold my pointer. That is a few feet beneath the

surface; that is the drift which was said to follow a fault running northwesterly, and which has been continued in a northerly direction by the plaintiff in the expectation of finding that the Black Rock vein was faulted to the north. That drift has been extended until in the end of it it has reached the wash *or* an old dump, some forty feet, so that the total distance from the Mill tunnel to the breast of that drift is nearly 80 feet. It was turned to the right and
turns through the granite country rock, very probably, if
1434 they wished to find the faulted extension, but it is all in
granite, and there is no faulted extension.

Further, on the lower level the side lines of the Black Rock as shown upon this level is where I lay this pointer. This cross cut from the Mill tunnel has been extended to a point about beneath that side line. Deeper down in the mine, as shown upon this model, what is called the 300 foot level of the Black Rock, which is reached by a vertical shaft 110 feet deep further out. There is extensive development which is accessible as that portion beneath the area described. So that we have a complete section of the country from the Mill tunnel to a point at least 350 to 400 feet further to the north. There are other veins developed in this 300 foot level of the Black Rock——

Q. At that distance to the north I understand you to say that the working did not encounter any faulted fragment of this vein which they have been following, which they claim might have been thrown to the north?

A. I will explain that the extension was through granite, and did not cut any faulted extension, and I will modify that by saying that we know that there is, further north, at a deeper level, of course, but a distance considerably greater by the working in the deeper levels, and that no faulted extension lying to the north exists, unless it has
been thrown a distance of several hundred feet to the north.
1435 In my opinion it is not a fault. There is a slip, such as we
have hundreds of them through the mine, extending in a northwesterly direction, and there is a very marked change of the filling of the vein easterly of this point. While the ore bodies of Butte are remarkably continuous, like all other veins, they have an end, both in depth and at the surface, and the appearance of a vein at the surface or near the surface over a large ore body is likely to be very different from that in the barren intervals between the ore bodies. The Mill tunnel north of the drift mentioned is shown upon the skeleton model where I now hold my pointer. The stopes of the Black Rock mine are as indicated. It is noticeable at once that there is an area where there has been no stoping in the upper levels. It is true that deeper down in the deeper levels of the mine that they extend northerly and cross the eastern end line of the Black Rock, but from the 900 foot level of the Black Rock nearly to the surface there are no stopes, and I believe that the change in the appearance of the vein going to the east is due to the fact that we are getting over into the leaner portions of the vein, and I believe that is substantiated by the fact that there has been no stoping in the Black Rock mine beneath this area. However, we have a vein, and a distinct vein, but of a different character. It is like in many

places that we knew more than one strand of quartz. The Mill tunnel which was driven in from the surface, and which goes
1436 through wash and then through solid granite, and which, by the way, is a further corroboration of the fact that there is no faulted extension to the north, because it ought to show in this working unless it is considerably to the north—that Mill tunnel is through granite until we reach the Black Rock vein, which extends in an easterly direction. There we have showing in the cross cut several distinct streaks of quartz; they vary in width from a few inches to as much as eighteen inches. These same streaks will vary considerably, even on different sides of the drifts, but there are several—three especially notable, quite distinct bands of quartz running in an easterly direction. To the east of this on the surface in an excavation for the Mill there was also a distinct quartz showing.

Q. How far east of the east end line was that excavation?

A. Right at the east end line. And still further to the south, as shown upon this map, as developed by two long surface trenches there is a third very prominent distinct streak of vein by itself, another branch of the Black Rock vein, trenching to the east, and I do not doubt that it could be developed continuously to a crossing of the east line further to the south than the vein which has been followed in the Mill tunnel. There is shown in this drift from the Mill tunnel several streaks which cross the tunnel in a northwesterly direction, and one, the most prominent, which has been fol-
1437 lowed and which shows a very considerable body of quartz, does not follow in the drift, but extends in a southeasterly direction as shown by a drift recently run which is not upon this map. There is a certain area east of that where there is very little quartz.

Q. How far has that drift been run?

A. That drift was in about 50 feet when I saw it. I don't believe it is much further. There is an area where there is very little quartz. We have the altered granite, very much altered, silicified in places, but not the distinct streaks of quartz only a short interval through there, but there is in my opinion nevertheless just as continuous a vein as there was in that portion of the Mill tunnel and the Niagara drift extending back to the discovery, although of much lesser value.

Besides those branches of the vein described, there is another southwesterly branch, which the Black Rock fault has followed. It extends south and across the Black Rock south side line. The hanging or the northern wall of it is shown by a raise put up from a little tunnel crossing the south side line of the Black Rock at a distance of about 190 feet southeast of the southwest corner. The south wall, I think, crosses the side line at a distance of 301 feet southeast of the corner, and I would like to explain in that connection that I use the term "I think" because that boundary is uncertain. In order to get it that far to the east we have to include an area of altered granite, which is not a bit more altered than the
1438 areas—or not as much altered as the areas of granite included within the vein at other points, notably at the Mill tunnel. There is a very distinct streak of quartz, two and a half feet in width;

there is a very distinct streak of clay about two and a half feet in width. No one would hesitate to say that that two and half feet of quartz belongs to the vein, or that the two and a half feet of gouge belongs to the vein, but when we undertake to include the altered granite to the east of that, it is difficult to say just where to stop. There is no question but what in the extreme east end of this trench it is country rock granite, but the line between the two is not sharp. I have taken the distance of 38 feet westerly from the east end of Trench E as the boundary of the vein, and this gives a crossing point, continued to the south line, of 301 feet. This vein extends to the south, and is developed by numerous trenches and other workings, and goes through beneath the discovery shaft of the Elm Orlu claim, and crosses the west end line of the Elm Orlu. It is developed by a tunnel driven in, a cross cut tunnel, which shows, among other things, that while the discovery shaft of the Elm Orlu is really upon a vein running toward the northwest, it is in fact at the intersection of the two, so that both veins are really in the discovery shaft, although at the surface discovery, some 100 feet above, there may have been only one. This is beneath the surface over 100 feet and is the nearest to the actual discovery that I have seen, on
1439 account of the Elm Orlu dump. This vein extending to the west is not especially plain throughout. There are old workings in places, and there is a distinct vein, but in order to get the width as shown a considerable area of altered granite is included, notably at the western end, where a cross cut has been run immediately along the west end line. There is a very distinct vein crossing that end line, but it is not by any means the width that is shown there on Defendant's Exhibit or on Plaintiff's Exhibit either. To get that area you must include a lot of the granite, some of it rather slightly altered, very much less altered than the granite which may be seen throughout the Mill tunnel. Having followed this on the surface, I will now trace it down. The Black Rock vein, that portion of it which crosses the western end line, as I said, is developed by the Black Rock raise down for a distance of 1300 feet. It is shown upon cross section 23, upon the different plan maps, and upon the skeleton model by the continuous red paint. This vein varies in width, but it is distinct all the way; it is rarely less in width than the width of the working, and it is often very materially more than the width of the working. In going through this raise we find that we are not on either wall, so we know the vein is wider. There is a showing of zinc ore in the Black Rock tunnel itself, and comparatively near to the surface, and that is sulphide ore. The oxidation has not,
1440 throughout extended very deep. There is also a considerable showing of sulphide ore in the Dewey tunnel, immediately to the south, at the same elevation, and in what has been called the Rainbow lode. There is rather good zinc ore developed where I now hold my pointer in the Dewey tunnel where it crosses the Rainbow lode, but generally speaking I believe it is true that the sulphides in this branch of the Black Rock vein extending to the west are rather higher than in the Elm Orlu vein to the south. Now, I cannot talk very intelligently about that, because I have not seen the

upper workings of the Elm Orlu; they are inaccessible; but the fact that the sulphides are somewhat higher to the north is what I would rather expect. The Elm Orlu shaft is here, as shown by the gallows frame on the block model, and the surface workings extend of course from there down. The Black Rock vein is down the hill and over in the gulch. While it is true that oxidation is largely caused, or at least assisted by percolating surface waters, it is equally true that if sulphide ores are entirely submerged in water, they are protected from oxidation, and I have always found that sulphide ores are likely to be at a higher elevation over in a gulch than they are on top of a hill.

The nature of the Black Rock or Jersey Blue vein, as seen in the raises and in the drifts extending from them, is similar to that found in veins elsewhere. There is the similarity of mineralization, as far as I know, in nearly all the veins of Butte. The vein
1441 filling, I don't believe—that is the minerals which enter into the filling of the veins, cannot be in any way used to tell when a vein was formed and whether one vein is the same age as another or different. They may be just alike in their mineralization, and yet it does not prove that they are the same age, so that I do not for a moment want to use that similarity as an evidence of these two veins being of the same age. There is a rather striking phenomenon which lies on the north side of the vein and can be seen almost every where, and that is the gouge which follows down the Black Rock vein. The Black Rock fault, which is evidently younger than any of the veins, was a violent disturbance; at least its effects have been that there has been a serious dislocation; not only along the main line of the fault, but along numerous branches. In the deeper levels of the mine it is rarely that you find just one blue line marking the Black Rock fault; it is divided into many branches, some of them running in a general northeasterly direction and others running across in different directions.

Q. Will you show that on the 1400 foot level?

A. It is shown on the 1400, and there are numerous other faults shown on the different levels, radiating in different directions. In my opinion these radiating faults were largely caused by sympathetic fractures that were produced at the same time as the Black Rock fault, although some of them undoubtedly were produced at the time of the Deadwood faulting, which was previous
1442 to that of the Black Rock. There is one evidence, though, outside of the mineralization, as to the relative ages of the Black Rock and Elm Orlu veins, and it is this: We know that the Black Rock fault was after the formation of the Elm Orlu and after the formation of the Black Rock vein; we know that the Black Rock vein is faulted by a younger vein, called the Deadwood; we know further from an observation of the faulting features, the gouge, and the nature of the gouge along the Black Rock vein, that it has been extensively faulted—it itself was a line of a strike fault extending along the vein. The explanation of this is simple: Simply that the mineral is in the gouge, and that the mineral which is in the gouge shows evidences of movement. To illustrate this I have

brought just three small samples. I could have got a wagon load of them. The first is simply a little nodule of zinc ore, which came from the Black Rock vein at the Elm Orlu 1300 foot level. The next is a rounded nodule having a little zinc and a great deal of quartz and manganese, which came from the Black Rock or Clark raise 40 feet below the Elm Orlu 800 foot level. I have purposely picked different material at those different points. The third is from the Black Rock 1200 foot level, about 60 feet west of cross cut 1208, from what has been called the Jersey Blue vein. This is a sample of the gouge. The other specimens are really enclosed in the gouge.

The gouge, which has dried now, was originally very soft.

1443 With my knife I simply cut off that portion which was around the enclosed pebble. There were other pebbles, and there are now many smaller fragments and a great deal of ground up zinc ore enclosed in the gouge. The large pebble, which I broke off to see its nature, showing that it is largely zinc ore, and it has been rounded, and was naturally there before the clay.

By the Court: What are these samples to illustrate?

A. The fact of the faulting which produced the gouge along the Black Rock or Jersey Blue vein, the fact that that faulting is post-mineral, that the particles of ore which are enclosed in the gouge were there before the movement took place, that they have been rounded by the same movement which produced the fault, that they were not deposited originally in a round form, but like all other ore in masses.

By the Court: You took it where from the fault?

A. I took these from the Black Rock or Jersey Blue vein, proving to my mind that this vein is also a fault; that there has been a fault along in this vein, and that that fault has been subsequent to the deposition of the ore which is included in fragments in the gouge material of the fault.

By the Court: Prior to the Black Rock fault?

A. It is a branch of the Black Rock fault in a way; it is a strike fault, occurring along the vein.

1444 By the Court: Of course both parties agree that the Black Rock fault was subsequent to both of these veins?

A. And I believe that this fault was produced at the same time as the Black Rock fault, and that it, like the Black Rock fault, was after the formation of the ore.

Mr. Dickson: I don't know that the other side dispute it, but they did concede that there is a branch of the Black Rock fault following the north wall of the Black Rock vein; they show a strike fault along their Rainbow lode, but they did not allude to any strike fault, whether a branch of the Black Rock fault or not, covering the Jersey Blue.

The Court: You may proceed, Mr. Wiley.

A. I was tracing the Black Rock or Jersey Blue vein down along the 1300 foot raise, and from those exhibits, the samples of gouge, meant to show that there was movement, post-mineral faulting, after the formation of the old original vein. This has in my mind a

bearing on the relative ages of the Black Rock vein and the Elm Orlu vein; and a further study of the relation of the veins can be made in this raise as we continue downward, due to the fact that at the 1300 foot level of the Black Rock mine it connects on the sill floor with what is agreed, as I understand it on both sides, is both the Elm Orlu and the Black Rock veins—that on that level we have a point of meeting. As to the exact position of the point, there
1445 seems to be considerable disagreement. We can follow not only down this raise to the sill floor but we can follow by a short drift 55 feet in length extending easterly from the Black Rock raise, the same vein which has been followed from the surface to a connection with the stopes of the Black Rock mine. That line is shown in the extreme hanging side of the Black Rock raise. It is shown in the skeleton model at the extreme hanging side of the sill floor, also in the 1300 level; likewise on section 23 which shows the continuous raise. It is shown coming in and meeting the branch coming across from the Elm Orlu vein at the hanging side of that level. If I may have section 9 of the plaintiffs please the comparison can be shown. The 1300 foot level—or, to start above—say the 1000 level of the Black Rock is where I hold my pointer, at the two places. There is no disagreement as to the upper portion of that raise except that the Jersey Blue raise, as depicted upon this, is narrower than the actual width of the vein; but down to the 1000 or the 1200 of the Elm Orlu there is substantial agreement. Below the 1200 of the Elm Orlu there is no raise shown upon this cross section although that raise is shown upon plaintiff's skeleton model, added on after the model came into court. That raise is shown upon cross section 23 of the Black Rock model and connects down in the direction it had above the 1300 foot level of the Black Rock, at the north side. The vein which has been followed in the raise above is continuously developed by the continuation of this raise
1446 below the 1300 foot level of the Black Rock where I hold my pointer. The blue streak upon plaintiff's section 9 purporting to show the Jersey Blue vein, maintaining downward and cutting across the Rainbow lode, is absolutely disproved at this place by the fact that a raise actually exists in the ground between the 1300 foot level and the 1200 foot level of the Elm Orlu and following this Jersey Blue vein, coming down on the hanging side of the Rainbow lode, and not as shown upon this cross section cutting into the Rainbow lode at a point thirty or more feet south.

Q. Can you point that raise out on the model?

A. That point on the model is where I am now holding my pointer. It is shown on section 23 and it is shown on the skeleton model.

The Court: That is, your raise departs from the blue where the pink comes in contact with it above the 1300 on your section 23, their section No. 9?

A. The raise actually comes down it to the 1300 foot level at the point where I now hold my pointer and I am following the vein depicted in blue on this section continuously from the raise above,

proving that the position of the Jersey Blue vein as painted on this model is entirely wrong.

Mr. Dickson: That section, you mean?

A. On this section, is entirely wrong as to its position in and across the Rainbow lode. As a matter of fact it does not cut into the Rainbow lode at all; it comes down and joins in that
1447 model as can be seen. The Jersey Blue or Black Rock lode and the Elm Orlu or Rainbow lode at the point of this raise have their point of union. They are united and below that point and in the 1300 foot level they are one and the same vein. There is further proof of this immediately to the east of this section 23 and plaintiff's section 9. A drift has been run on the second floor of this Jersey Blue towards the east a distance of 55 feet. It breaks there into the stopes on the 1300 foot level and proves that the same vein which has been followed from the surface through the Black Rock raise is mined and developed in the stopes from the 1300 foot level and is continuous from there a long distance to the east. The blue streak as shown on cross section 9 of the plaintiff at the 1300 foot level is actually developed on the extreme northern end of the stope at this point, 55 feet east of this section on the second floor of the stope. The stope is 52 feet in width. We have on the northern side a distinct clay gouge and definite dipping north wall upon which you can place your hand as you could on the wall of this room, and walk right back to the Jersey Blue vein and up the Jersey Blue raise. South of this hanging wall, which is the hanging wall of the united Black Rock-Elm Orlu vein, we have three definite small occurrences of gouge. Two of them are in the midst of the solid ore; the third is on the foot wall. The gouge which appears in the other varies from two to three or four inches in thickness. It is a
1448 common occurrence in the stopes of the Black Rock mine.

Q. Of the Black Rock or the Elm Orlu?

A. The Black Rock and Elm Orlu. At the point where this is shown on plaintiff's model there is a blue streak painted extending continuously through the stope, having a width of ten feet. The existence of this streak connecting back to the Black Rock raise is absolutely disproved by the connection of the drift 55 feet in length which I mentioned. The only facts on the two floors to justify the painting of this streak ten feet wide are that there is a streak of gouge two or three inches in width. It has an easterly and westerly direction, not agreeing with the direction as painted upon this model. The position of this is more plainly seen upon plaintiff's exhibit 22, the plan of the 1300 level of the Black Rock mine. The Black Rock mine is shown in the plan which I now—where I now hold my pencil, to the north. The stope which I described is not this solid, a little over an inch east of this raise. The blue streak which is painted upon this model continuing in a northwest direction through the stopes of the Black Rock mine has no justification other than the existence of small—quite small streaks of gouge in the ore of the Black Rock mine which appears here and in other places. It cannot be seen upon the sill except at the face of the level, which is

rather badly caved, but which I saw some time ago—there is a distinct streak running easterly and westerly on the hanging
1449 side. It does not run in a diagonal direction through and across the sill floor or the stopes. At the extreme southeastern side where the streak is shown of unusual width and extent it has a southeasterly direction—on the sill floor which is shown here nothing can be seen, but on the fifth or sixth floor above there the conditions can be examined. At that point in the stope we have the Black Rock fault running in a southwesterly direction. We have some slips of clay on the extreme north side of the stope but nothing which in any way justifies the depicting of this blue line sharply drawn through the stopes of the Black Rock vein. In other words, as the result of this observation I absolutely believe that these two veins on the 1300 level of the Black Rock have become one.

Q. That is the Jersey Blue and the northerly dipping branch of the so-called Rainbow?

A. The Jersey Blue and the northerly dipping branch of the Elm Orlu. The southerly branch, or what would be called the main Elm Orlu vein and which has been described as extending downward in the Bruce raise is developed from the 1500 foot level of the Elm Orlu upon the 1400 and upon the 1200 level of the Black Rock and from the 1200 Black Rock up to the 1300 Elm Orlu. Above that it is in the mine workings of the Elm Orlu mine. It is in line with the upper stopes of the Elm Orlu. These raises are substantially
1450 vertical. They are in ore wider than the raise, in a downward, nearly vertical vein of considerable size.

Q. How many feet at least?

A. In places twenty or thirty feet in width and some places more.

Q. Will you scale it and give the court the distance northerly from the foot of the Bruce raise to the northerly limit of the north dipping branch or where you say it unites with the Jersey Blue vein in its downward course?

A. It is about 300 feet.

The Court: What is that now?

Mr. Dickson: The distance from the bottom of the Bruce raise, which we claim is in the main branch of the Elm Orlu vein, across northerly to the point where we have in the 1300 foot level, as Mr. Wiley has already pointed out, the northerly dipping branch of the Elm Orlu uniting with the Jersey Blue or Black Rock vein—300 feet across.

The Witness: The extreme distance. That Bruce raise unfortunately is right in the middle of the block.

The Court: Where would it come, projected on to the section, 23?

A. Coming downward it would come about where I hold my pointer, about where the Black Rock fault is marked. But it is in the middle of the block and it has not been projected into section 23.

Mr. Dickson: If you can have some of our draftsmen, be-
1451 fore court opens on Monday, have a cross section made through the Bruce raise.

The Witness: It can be projected on either cross section.

Mr. Gray: Could he, while he is doing that carry that vein in that section right on up, this same vein?

Mr. Dickson: All I care about is what I have asked him.

Mr. Gray: I will have him put the other on.

The Witness: Carrying it on up, I said it is a downward continuation of the main Elm Orlu vein. In other words, there is a vein shown by the stopes of the Elm Orlu substantially vertical. In my opinion it extends on downward to the deep; how far I do not know. There is the Black Rock vein which extends down, dipping to the south and then turning and dipping to the north. In connection therewith, the connecting link, a large body of zinc ore, produced probably by the mineralization of both the Black Rock and Elm Orlu and this link connects across from the Elm Orlu to the Black Rock vein. I should treat that all as a conjugate or complex, somewhat complex system of veins, dividing and going down the same as this division on the strike near the surface.

Now, this same condition is shown deeper down in the 1400 foot level. That is, there is no continuous downward of this Black Rock raise from the 1300 to the 1400, but the stopes are connected
1452 and a little further to the east so there is no question but that the stopes upon the 1400 are upon the same vein as the stopes upon the 1300. The Jersey Blue vein is also shown upon plaintiff's 1400 foot level, cutting along the southern side of the stope, not through the middle of the ore, and on the 1300 below along the southern side. The justification for that is that there are some clay slips immediately on the south side. Two crosscuts have been run a short distance to the south and they cut through not only one slip, but through several slips; and these slips have been lined up as proving—as being the continuation of the Jersey Blue vein on the south side of what the plaintiff calls the Elm Orlu vein. This same blue streak, the Jersey Blue is shown going through the stopes above the 1400 foot level of the Black Rock.

Q. Shown where or by whom?

A. By the plaintiffs.

Q. Just turn to their section?

A. It is painted upon the skeleton model.

Q. Of the plaintiffs?

A. Of the plaintiffs. The blue streak to which I allude is beneath my pointer.

Q. On plaintiff's exhibit 24?

A. Yes, on plaintiff's exhibit 24.

Q. Wherein do you say that is incorrect, that representation?

A. The justification for that is that at the end of this 1400
1453 foot level there is a clay slip. It is the gouge which is upon the hanging wall of the lode, one lode which exists at that point. In cross cuts running to the south there is clay gouge. These sills, as a rule, you cannot see what is there; they are closely timbered, but in this particular working you can follow along the southern line of this stope for more than a 100 feet, and some such thing as that exists; there is a little clay in places.

The Court: Not quite so conspicuous on the ground as on the map?

A. By no means. It is about the width as given, as it is on the map, but it is not continuous, not allowing for multiplying this 480 times—it hasn't even that width continuous between these points. And further to the east where this is shown crossing these cross cuts—1406 I have never seen—1416 is open—there is a clay slip at that point—there are two of them in fact. One of them runs nearly in that direction and the main lode extends out to this slip. That should all be colored red, where it is white north of the blue.

So, as I say, these slips, fractures due to the extensive faulting, can be found throughout this area no matter whether you go along a drift or whether you go through a crosscut. They do not exist as a continuous connecting band of any size. They are found in many cases through the ore. There will be two or three of them through the stopes; the ore breaks off in great blocks along these slips and has to be heavily timbered.

1454 Now, there are numerous places where this Jersey Blue vein is traced to the east of the Black Rock fault by the plaintiff. As I say there are many slips, innumerable slips through the mine, also innumerable streaks of quartz, and we can find at the points indicated by the blue line upon plaintiff's exhibit almost invariably some slips. In this particular case we have quartz.

Q. What particular one?

A. By the blue slip which has been termed the eastward extension of the Jersey Blue vein, eastward of the Black Rock fault. But there is no—at any of these points—at none of these points which have been so designated is there any working which is now open justifying the correlation of these points with the Jersey Blue vein; not a one of them is anywhere near the size of the Jersey Blue vein.

Q. Have you observed what the actual width of the slip is as shown on plaintiff's exhibit 24 where it crosses 1401 cross cut?

A. There is six inches of quartz on the easterly side. The westerly side is closely timbered. On the 400 and 450 foot levels of the Black Rock we have an unusually good place to study the nature of the country away from the veins. We have cross cuts which extend for distances nearly one thousand feet not exactly on the same level, the 400 being fifty feet higher than the 450, but generally they give a cross section of that country. Some of the slips encounter

1455 the more prominent ones and are shown upon this plan map, defendant's exhibit 67. In cross cut 401 extending north there are eight shown. In the crosscut extending south there are about twenty. These vary in size, some of them are as much as a foot in width. Those which have the red contain quartz; some of them contain ore, a little ore. None of these have—none of these can be considered worthy of development as veins, and they illustrate the character of the slips which have been designated, where they come in line with the extension of the Jersey Blue east of the Black Rock fault.

There is one other complication about which, as I understand it, there was considerable disagreement. That is another branch of the

vein called the Pyle strand. On the 1100 foot level of the Black Rock there are extensive stopes south of the main stopes of the mine and as I understand it from the 1100 to the 1000 there is a raise. I have never seen it except at the top, on the 1000 foot level. It has been unaccessible. But I have been up a raise connecting that from the 1000 upward to its top, above the Elm Orlu 500 foot level. This raise is closely timbered, necessarily I presume on account of the nature of the ground, and it is not easy to tell just what is in that raise. I have done the best I could and as a result of that I should say that from the 1000 up to the 700 foot level of the Black Rock it follows a good big vein. It is not only a good big vein on the
1456 raise but there is a level on the 1100 foot level of the Black Rock drifted to the west which follows a good strong vein; it is a fine vein, six feet in width. It has a dip as you go up towards the south—that is to the north going down, about 70° as shown by a raise at its end, some fifty feet in heighth. We go up this raise on a good vein, also to the 800 level of the Black Rock and there there is another drift driven to the west starting in a fine big vein, the same vein which has been followed by the Pyle strand. This level, as we will see on the model makes a decided bend to the north, a very decided bend to the north as we go west. The vein, which is in the raise, is certainly six feet in width and probably more.

Q. At that level?

A. On the 800 foot level, and it is followed as a good vein for a ways, but it makes a decided bend and in the breast of that drift it is just exactly five feet wide, between unaltered granite on either side. And the vein which below had a decided dip to the north is almost vertical. It still has a little dip to the north at that point (indicating). It was this drift that was spoken of by the plaintiff as going to connect with the drift from the Elm Orlu 900. These are nearly on the same level and the map speaks for itself. That never will connect unless there is a decided freak of nature between these two breasts. And the first point I will mention is the apparent change in size, the bend on strike, and the necessary change
1457 in dip that goes with it of this Pyle strand as shown on the 800 foot level of the Black Rock.

Q. There would be a necessary change of dip and an apparent change of strike?

A. Yes, we would expect it. Now, this same Pyle strand is filled up above the 800—certainly the 700, and to a point thirty or forty feet above the 700. Now, all along there I hunted for that vein, naturally, in the end of the raise east and west, and I could find it where I could see the gouge. But above that probably I found only granite in the body of the raise to the east and west end, but by searching on the sides, the upper—the south side and the north side I did find vein matter with some change in direction of that Pyle strand so that instead of having the east and west course which it has in the lower part of the raise, it is turned even that low down, to a more northwesterly course, this direction corresponding with the course shown in the drift below. I don't know the exact course through that section only that I find it on the sides instead of the

ends, and there it is generally northwesterly. The timbers obscured actual observation. However, I was in this raise while it was being driven and at a point about 100 or 120 feet above the 700 foot level I saw the top of that raise.

Q. As it then was?

A. As it was at that time. Of course that is topped there by no timber, and it is possible to see accurately what was there. There was a distinct streak and it had a direction north 32° west.

1458 I believe that this streak is the same one which was followed below for some distance, showing in a northwesterly course and forming the east and west Pyle vein. This raise has since been continued upon connection with the 450 foot level and on the 450 foot level we see what is probably the same streak that ran north 32° west, but in addition we have two other streaks and we have a construction of solid clay streaks.

But the general direction of these streaks as shown upon the 450 foof level is northwesterly. That direction coincides generally with the direction on the 800 foot level of the western portion of the drift following that vein, driven at the plaintiff's request. A small drift called 457 has been driven on this 450 foot level following a small strand of that branch in a northwesterly direction, and back to cross cut 451, at a crossing of the north side line of the Black Rock claim. This vein has a dip in a southwesterly direction of 65 degrees. It is not only at that point inside the Black Rock ground, but it is away beneath the surface, and has a dip which would carry it still further into the Black Rock.

Now, the upper continuation of the Pyle raise is at a point 106 feet further to the west. It is extremely difficult to see what is in that raise, on account of the timbering and the fact that at the back of the timbers there is dirt, but as far as I can see, there is a slip—at two or three places I can see a little quartz extending up-

1459 ward through that raise, and I can trace what I believe to be the same thing back into a drift driven by the Elm Orlu on the 500 foot level. This drift follows a streak which has a dip of about 55 degrees in a southwesterly direction. The portion which contains more quartz, and to my mind is perhaps all that there is at this level of the Pyle raise as shown on the 450, is not known at all above this level. On the Clark tunnel above there are extensive workings, going clear across the Elm Orlu claim, which ought to show the upward extension, which undoubtedly must show the upward extension of this vein. There are two veins, two streaks, which can be designated as veins, cut by this tunnel, and numerous smaller slips. The drift which was driven along a small slip running in the direction of the Elm Orlu, turns and follows in a northwesterly direction, as does also the western end of the Clark drift. It seems to be the habit of those streaks, even if they are small, to run northwesterly. The distance from drift 4 in the Clark tunnel—the Pyle raise which I have attempted to describe is shown upon section 28 of the block model, and has the various streaks shown, as are also the streaks in the 400 foot level. There are numerous other streaks

to the south in the 400 foot level, which purposely have been left off this model, because they would have to be projected a considerable distance, and their strike is not at right angles to the plane of section, so that, if shown upon there, projected at right
1460 angles, they would appear in the wrong position with regard to the working, so they are purposely left off. They do appear upon the plans. The drift No. 4 from the Clark tunnel, which is just about 30 feet north of the Black Rock side lines, has a small vein substantially vertical. The position of this vein on section 28 is shown by the little red marks.

Q. Which vein do you now refer to?

A. To this vein corresponding to the vein in drift 4 of the Clark tunnel. We have the Pyle strand developed, not only there, but we have the complete cross cutting of the surface, so that we ought to know the conditions existing. We have a small vein extending upward with a dip of about 65 degrees on the 400 foot level; on the Clark tunnel we have a vein which is nearly vertical; it is the best of all the veins in the possible area for the upward extension. It is something of an assumption—very much of an assumption to say that the small vein below on the Clark tunnel is the same as the vein above, when it has to make a change in dip and has to bend back; but when we study the conditions, when we take, for instance, section 14 which passes through the same ground; when we see that what is called the Elm Orlu vein dips to the south and comes around and makes a bend and dips to the north, and we have the parallel Pyle strand extending up, and there if we draw a line between the two points in the Clark tunnel and the Pyle raise below, we
1461 have a line almost exactly parallel with the main Rainbow lode above—when we do that the presumption is not so bad; especially when the so-called Jersey Blue vein, as shown upon the plane of section, has the sinuous course depicted by that blue line. In other words, I believe it altogether probable that the upward extension of the Pyle strand has actually been cut and is in the drift which is shown upon plaintiff's section 14 by the blue line which has been called the Jersey Blue vein.

Q. Have you finished your general statement, Mr. Wiley?

A. I think that is amply sufficient.

Q. I will call your attention to some of the points—without going over all of them; I will leave it to the other side to touch on them on cross-examination—but a few of the places, or all of the places where the plaintiffs claim that they have the most distinct and satisfactory evidence of the fact, as claimed by them, that the Rainbow lode is not only crossed by, but faulted by the Jersey Blue or Black Rock vein. One of those places where they say they have satisfactory evidence.

A. On the 450 foot level of the Black Rock we have a drift called 456, driven by the plaintiffs to the west of our main crosscut, toward the south to follow the southern extension of the Jersey Blue vein, which drift does follow a small slip, and out near its breast this slip makes a turn to the left, and that has cut off the quartz of the

Rainbow lode. There is the appearance of the faulting of
1462 the Rainbow lode by that slip. The quartz comes up to it, and you can see it plainly there cut off. Whether there is quartz further north or not, and whether this slip merely penetrates a body of quartz, I don't know, because it is unexplored, but this slip turns to the left and follows the Black Rock fault, which is shown there. In my opinion it is merely a strand or branch, however, of the main Black Rock fault, one of the sympathetic fractures caused by the fracturing of that section of country. I think that, with equal or greater degree of probability of being the extension of the veins in the west, most of them, the 20 or so which are cut in that cross cut, could have been followed.

Q. What do you find in 456?

A. I find a small slip which has been followed by the drift.

Q. What in the way of mineralization or quartz?

A. It is not sufficiently mineralized in my opinion to constitute a lode of any sort, or rather, the extension of the Jersey Blue.

Q. Now, go to the 700 Black Rock; I think that is another place where it is claimed on the other side that there is satisfactory evidence of such a crossing in the westerly part of the 702 drift, running westerly from 701 cross cut?

A. The 702 drift follows a small vein; it is a vein, however, distinct, and has a slight dip towards the north. The conditions
1463 at its intersection with the so-called Rainbow lode are not such that one can today determine what does happen there; it is closely timbered, and stoped, so that personally, not having seen the drift when it was run, I cannot say; but the Exhibit itself shows that there has been probably some dislocation of the main strand by that slip. That is something which would not be altogether unexpected, and which might happen, in a number of places, and does happen in the mine, slight dislocations of the ore in the stope by slips, other than the main Black Rock fault.

Q. Do you think that the slip which is found in 702 is one of the strands or branches making out from the main Black Rock fault?

A. I do not consider that the vein found in 702 is a continuation or is proved to be a continuation of any vein to the west. The gouge which accompanies that vein is a line of faulting on which there has been some movement. Whether it is a strand of the main Black Rock fault I do not know. I believe it is a fracture, which, when the extensive Black Rock faulting occurred, was produced at somewhat the same time and by similar agencies.

Q. Have you anything to say of the mineralization in that 702 cross cut with reference to the slip?

A. That 702 is a drift, and is on a small vein; there is some mineral-zation and quartz through there, but of no value, and in no way can it be compared as to value with the Jersey Blue vein.

1464 Q. How as to size?

A. It is much smaller in value and in size, and has no points which would lead me to suppose it was the same vein.

Q. In your opinion is that vein found in 702 drift, a proven seg-

ment or continuation of the Black Rock vein southeasterly from the Black Rock fault?

A. In my opinion it is not.

Q. I will ask you, Mr. Wiley, if you have made a careful examination of each of the places where it is claimed by either of the witnesses for the plaintiff that the Black Rock vein has faulted the Rainbow vein?

A. I have, where they are accessible. Here is one of the points where my examination is incomplete, in that I did not see it before it was timbered.

Q. Have you found at any of those places or elsewhere any conditions disclosed, open to observation which in your opinion points to the conclusion that there has been any such faulting of the so called Rainbow lode by the Black Rock vein?

A. I have seen nothing that leads me to draw that conclusion.

Q. You have heard the testimony of the plaintiff-, and you understand their claim to be that in the westerly portion of the Black Rock claim the Black Rock vein in its downward course or dip has intersected and passed through and beyond and to the south of the Elm Orlu vein. What observations have you to make about that?

1465 A. I made the observation that I stated on the 1300 and 1400 levels, which to my mind prove- beyond any doubt that instead of crossing, the Black Rock and Elm Orlu veins join. There is one other place which I have not mentioned, the 1700 foot level of the Elm Orlu. At that point a distinct vein, although a poor vein as far as any value is concerned, has been cut in that tunnel having a northwesterly direction, and the cross cut has been extended beyond that. At the time of my visit there was a short drift about six feet in length run upon this fresh vein, and the cross cut had been extended beyond through some scattered manganese and quartz, but had not reached what I would call the main vein. The exhibit here substantially shows the positions as I saw them. The conditions existing in addition were that there was considerable mineralization in the cross cut, especially on the south side, back of the vein which has been called the Jersey Blue by the plaintiffs. To my mind it is by no means proven to be the Jersey Blue On the 1400 and 1500 foot levels of the Elm Orlu immediately above this point right there, there are two cross cuts showing the nature of the ground before you leave the main lode, and in those cross cuts there are a number of strong northwesterly veins, which are cut before the main vein was reached. I would expect similar conditions below; I would fully expect, after we cut on the two levels above streaks before we reached the main vein and before we reached the Jersey Blue—I

1466 would expect similar conditions on the 1700, and I believe that the vein which is cut there is one of those just above; which one I do not know. There is one point of striking dissimilarity to the plaintiff's testimony, in that, while the latter 40 or 50 feet of the 1700 foot cross cut is extremely wet, water dripping all over, that this which is called the Jersey Blue is entirely dry; so that, if the Jersey Blue is usually a very wet lode, and it is, then that

would be some little evidence against that being the Jersey Blue on the 1700.

Q. Have you any notes or can you without reference to your notes give the court some information as to the size and thickness of the streaks there found in the cross cut on the 1500 foot level running in a southeasterly direction southerly from the main Jersey Blue vein?

A. On the 1500 foot level of the Elm Orlu at a distance of 18 feet back from the south or foot wall of the main vein, there is a streak of quartz 18 inches in thickness, dipping south 85 degrees. At 28 feet back there is another 15 inches. Twelve feet further there is still another; all of these strikes have a general northwesterly course; I have the exact courses here if you want them. 23 feet back of that there is another streak three feet wide, containing considerable zinc ore. There are others still further back. On the 1400 foot level there are also similar streaks, some of them containing considerable—one four feet in width having a dip 85 to
1467 the south and containing a lot of zinc.

Q. I wish particularly to call attention to the one that is indicated on the 1400 foot level on the model 101?

A. Well, there is one 46 feet back, the first one, which is five feet wide, and contains manganese, quartz and zinc; and back of that they are to be found all the way through the cross cut.

Q. Are there any workings between the 1500 of the Black Rock and the 1700 of the Elm Orlu which would develop the same ground, at a higher elevation as developed by the 1701 cross cut?

A. There are no other workings. The 1400 of the Black Rock goes but a few feet below the 1500 of the Elm Orlu, so there is no 1600 extending out so far.

Q. Calling your attention again to Defendant's Exhibit 101, the skeleton model, and to the body of ore having a northerly dip from 1115 cross cut, shown upon this model, down to where you have said that it unites or merges with the Black Rock vein, below that mass of ore, with a northerly dip, from this 1115 cross cut down to the point where they merge; when you get below that point of junction, I understood you to say that the two veins, the Black Rock vein and the southerly branch of the Elm Orlu vein continued down as separate veins to the deep?

A. They do.

1468 Q. State briefly your reasons for that conclusion?

A. Well, it is simply the development in the mine. In the first place we have the Elm Orlu vein standing substantially vertical, and its downward development is by the Bruce raise and other workings. It is irregular at many places; the Black Rock fault cuts through or near it, but it does continue down on that section.

Q. And that is below the bottom, below the lowest horizon where you have ore making across from one vein to the other?

A. Yes, lower, considerably, than the beginning of the branch which connects across to the Black Rock vein; it is a little lower than the point of ultimate union, but this branch is larger than the main vein continuing down; that is true, there is more mineralization,

and especially more commercial mineralization through that area than there is in the downward extension.

Q. In the southerly branch?

A. Yes; I want to be understood as stating that.

By the Court: Perhaps a hundred feet might change that?

A. It might very materially change it. There are poor parts or good parts in these mines, just as in all the others.

By Mr. Dickson:

Q. What is the level at the bottom of the Bruce raise?

1469 A. That is the 1500 Elm Orlu.

Q. That would appear, looking at this model, to be a very considerable distance, 80 feet or more, below the bottom of the ore body between the two veins?

A. The point of ultimate union of the branch of the Elm Orlu and the Black Rock lode is on the 1300 foot level at the Black Rock raise, and this Bruce raise extends down to the 1500 foot level, some 60 feet lower in vertical elevation. I see the vein in the bottom of that, and know that it continues on down.

Q. What is the thickness of the vein at the bottom of that Bruce raise?

A. Ten to 12 feet; that is rather closely timbered; the raise itself is necessarily closely timbered, but it is all in vein.

Q. Did you have a chance to observe the ore that was in the bottom of that raise.

A. Yes, and in the raise itself. I was in it while it was being driven.

Q. What kind of ore was it?

A. Some of it is good zinc ore, which will be stoped some day.

Q. If the south branch of the Elm Orlu vein has been followed down practically vertically from the surface down to the 1100, where we have then a northerly dipping branch, and below that a body of ore extending across going on down for some distance anyway—vertically below that—if that extends down to the 1700 foot

1470 level of the Elm Orlu, where would you expect to encounter it on that level with reference to the Elm Orlu shaft?

A. Well, I don't know; it would be south from it, I could not say where. As a matter of fact, the 1600 foot level has been driven out and goes across the Black Rock fault, and it is shown by the cracks in the drift itself that there has been some disturbance. I have not examined the 1600, except very shortly, and I have not been in the 1700 drift; the drift is badly caved, and you have to crawl over a lot of muck, and on account of the conditions there it was hard to examine, but there were indications of some disturbance, and it is very possible that a portion of that downward extends as shown in the Bruce raise, is already developed in that 1600.

Q. You have been in the 1700 northwest cross cut?

A. Yes, in the cross cut, but not in the drift.

Q. That vein which is depicted on the 1700 of the Elm Orlu by the plaintiffs as the Jersey Blue vein, what was the dip of it upon that level?

A. It dips south 81 degrees, and had a course at the time I was there of south 67 east.

Q. What was the dip of the Jersey Blue vein on the 1300 level, the one next above it, where there had been any work done?

A. On the 1400 of the Black Rock.

Q. The 1500 Elm Orlu?

A. It dips slightly to the north.

1471 Q. Are you able to state without some extended calculation whether or not, if the southerly branch of the Elm Orlu vein did continue downward and westward as far as the Elm Orlu shaft on the 1700—where it would fall, whether north or south of that shaft?

A. It would go south, but I don't know how far. I have made no calculations; I could not make a very good one; it is a mere guess, so I would prefer not to do it. Its direction is irregular and I don't know where it would go.

The Court: Are you speaking of the copper vein?

Mr. Dickson: No, your honor, we are speaking of what they call the Jersey Blue vein on the 1700 Elm Orlu—no, the last one I spoke of was the downward continuation of the south branch of the Elm Orlu or Rainbow lode, if it did continue to the 1700.

Mr. Gray: You mean the blue vein there?

Mr. Dickson: You don't claim this to be any part of the Rainbow; that is the copper vein.

Mr. Gray: The one you were just asking about was this new vein.

Mr. Dickson: Yes.

Q. Have you made an examination to determine where the northerly boundary or hanging wall of the Elm Orlu Black Rock vein crosses the south side line of the Black Rock claim?

A. I have already stated that I thought it crossed it 190 feet southeasterly from the southwest corner.

1472 Cross-examination.

By Mr. Gray:

Q. Mr. Wiley, I understood you to say that you were quite familiar with the mines of Butte?

A. You understood wrong; I said I had examined a good many of the mines of Butte.

Q. That goes back to the time when you first examined the territory, which was in the controversy between the Colusa-Parrott and Anaconda companies, where the blue vein was first developed and proven?

A. It goes a good many years back of that.

Q. You are familiar, however, with the conditions in Butte, as they were prior to the development of the blue vein?

A. I knew something of the conditions.

Q. You had never been able to locate—you had never discovered these northwest fissures prior to that time, had you, or recognized them?

A. Yes, I had recognized that there were northwest fissures.

Q. They never had been definitely developed or followed up with care, had they?

A. Those northwest fissures were known all over Butte, but their relation to the other fissures was not known.

Q. And it was first developed at the time of that litigation?

A. I don't know that that was the first; that was the first
1473 time that I personally fully recognized them, yes.

Q. And when was that?

A. I can't give you the date of that.

Q. That must have been back almost to your 16 years?

A. No, I don't think it was as much as that.

Q. About 1900, wasn't it?

A. Probably something less; I don't remember.

Q. Your familiarity with the blue veins did not cease then; you also examined it and became acquainted with the geology surrounding it in the later litigation called the Nipper case?

A. Well, I was not here during the main Nipper case, although I was here on some of the preliminary matters.

Q. But you had made examinations?

A. I had made very brief examinations.

Q. Later, when the question of the relation of these veins arose at the Stewart, you also made careful additional examinations, didn't you?

A. No, I had made an economic examination of the Stewart years before that, and at the time of that litigation I think I devoted two days, that was all.

Q. And there again the question of the relation of the old veins and the northwest veins and the northeast post-mineral faults came into question, didn't they?

A. The general relations of the veins would have arisen, yes.

1474 Q. In addition to that you have familiarized yourself in a good many other cases with the structure here?

A. No, I cannot say I am familiar. I think to use that term one must have been here for years, it is so complex. I know something of it.

Q. All right. You have said something Mr. Wiley, about post-mineral gouges that you have found in the Jersey Blue vein, from which you are forced to the conclusion or which you say leads you to the conclusion that the Jersey Blue vein is of the same age as the Rainbow vein. I am using the terms which we employ, and you need not be bound to accept them or be bound by them.

A. I am perfectly willing to accept them. You are probably right in calling this the extension of the Rainbow lode.

Q. You said that there was no evidence——

A. That is one of the evidences, that in connection with being able to trace the actual union.

Q. In other words, you felt that the finding of what you term the

post-mineral gouges in the Jersey Blue vein justifies you in drawing the conclusion that it was not later in date than what we call the Rainbow.

A. That is one of the reasons.

Q. Now, I presume you examined the Deadwood vein with some care?

1475 A. I examined the Deadwood vein, although I would like to add that an examination of the Deadwood vein cannot be made nearly as thoroughly, due to the fact that it is concealed by timbers and the crushing of the main stopes, so that it is unusual to be able to make a satisfactory examination of the Deadwood. On the 1000 that is not true, because it has been developed for a long way.

Q. Yes, in the upper levels it is rather hard to examine?

A. In the upper levels it is difficult to see where the Deadwood vein is; I cannot say.

Q. Somewhat similar to the conditions Dr. Emmons described in the Jersey Blue?

A. I don't know what his description was.

Q. You were able, however, to examine the gouges in the Deadwood?

A In the drifts on the 1000 and at some other points, yes.

Q. And what did you determine as to those being post-mineral or pre-mineral gouges?

A. I don't know; I did not have that point specifically in view.

Q. You did not undertake to make any examination; suppose that it be found upon investigation that the gouges of the Deadwood vein contained the pebbles that you have pointed out to his honor in the gouge from the Jersey Blue vein, what have you then to say as to whether it is post-mineral or pre-mineral?

1476 A. I think it extremely probable that the gouge in the Deadwood would contain pebbles of mineral; in other words, I believe that the faulting along these veins in many cases may be comparatively recent; that is, the motion may have extended to recent times, and that you may find gouge anywhere which contains particles of minerals.

Q. And also bowlders or small pebbles of country rock and of vein material?

A. If there has been movement you might; if there has been extensive movement.

Q. What is your judgment concerning that from your acquaintance with reference to the gouges of this northwest Deadwood vein?

A. I have not sufficiently noted the occurrence of minerals in that. I noted enough to know that on the 1000 foot level—I was there but once, and that was a hurried examination, and I did not very much study the Deadwood vein, on account of going across the big stope on the main vein, so that while I have seen it on different levels I have not observed as to whether it contained crushed mineral or not.

Q. For the purpose of judging of the relative ages of these fissures, what one of the blue vein series have you in mind when you do make this examination of the gouge for the purpose of showing or

learning the ore, knowing that it is different from the gouge which you presented to his honor today?

A. I don't quite understand.

1477 Q. You concede that the northwest veins are later in age than the Rainbow veins?

A. The Deadwood vein is later, yes.

Q. And you concede that the Blue vein is and the northwest veins, do you not?

A. Yes, that many northwest veins, but I also should say then that the course of this Black Rock vein is east and west and not northwest.

Q. Some of the veins which you say are junior to the old veins, the ancient veins, have you ever examined the gouges of these veins to ascertain whether or not they contain these pebbles and this mineral which you have pointed out as indicating that the gouge of the Jersey Blue is post-mineral?

A. I don't know they do in places; I don't know.

Q. Then upon what information was your conclusion based that this is a post-mineral gouge, because it contains these pebbles?

A. It evidently is a post-mineral gouge, and I had understood that the contention of the plaintiff in this case was that the mineral came after the gouge. I simply wanted to show that in my opinion the gouge came after the mineral.

Q. You understood that that was the contention of the plaintiff?

A. I certainly did.

Mr. Kremer: Isn't it?

Mr. Gray: I was trying to find out from this gentleman. It is my opinion that there were alternate periods of mineraliza-

1478 tion and faulting but I don't suppose I am like the professors, the judge.

Q. It was only, then, for that purpose, to dispute what you believed was the contention of the plaintiff, that you produced these samples?

A. I had understood, or thought I understood, that the statement was distinctly made that the gouge was an ancient gouge, in their earlier at least; that the mineral came after the gouge. Maybe I was mistaken.

Q. Isn't it true that you presented them as one of the arguments in favor of the idea that this was an ancient vein, rather than to dispute any theory that you thought the plaintiff entertained?

A. I want to state that the vein—I wanted to show that the vein was there before the gouge; that the vein was there before the fault which produced the gouge, yes, to that extent.

Q. That is the ore was there before there was any gouge?

A. That is was simply an evidence—one of the evidences—that it was an old vein; and that in connection with the fact that the veins have been traced to a junction, is proof that it and the Elm Orlu were of the same age instead of different ages.

Q. And you produced them without going into an examination of

the gouges of any of the younger veins to ascertain whether or not they were similar?

A. I simply——

Q. Can't you answer that question yes or no?

1479 A. Yes.

Q. Now, if you want to explain you may do so.

A. I think that is sufficient.

Q. Mr. Wiley, this level, this map that you have criticised which has been introduced in evidence, the 1300 Black Rock, exhibit 22,—the point at which you criticise that was I should judge twenty feet southeasterly of station 331, the same point pointed out by Mr. Burch this morning?

A. It is south of the Black Rock raise, yes.

Q. That is the point where you consider it is in error?

A. That is one of the points. It is the whole line across, the point that I criticised.

Q. It is the same point that you pointed out to his honor on section 9, that you said incorrectly showed the place where the gouge came to the Rainbow lode?

A. I know it incorrectly shows it because the gouge had been followed by a raise not shown upon this section and which shows that that blue streak is not there at all but is way over here on the north side of the raise.

Q. Of course you heard the testimony given at the time this exhibit was introduced in evidence?

A. I think I did.

Q. And you know that through a portion of this plan this Jersey Blue was projected, don't you?

A. I didn't hear anything about projection; but if it is it

1480 is certainly projected in the wrong place. There isn't any such thing there.

Q. There is an error, according to you, of some twenty feet in the placing of that gouge on that level?

A. There is an error of at least twenty feet opposite the raise and considerably more in the Elm Orlu to the east, and on the Elm Orlu in the whole location, throughout the whole length; in other words it ain't there.

Q. Now, Mr. Wiley, that has nothing to do with the map itself, the question whether it is there or whether it isn't there.

A. It has a whole lot to do with the mine though.

Q. All right. Were there any other places that this was shown upon the plaintiff's exhibits where you desire to make a correction—I suppose you have examined them all sufficiently?

A. That is the extreme place, but the 1400 is also wrong, and the maps are wrong in every place that they show any strike east of the Black Rock fault, in that they correlate it with the Jersey Blue vein.

Q. Will you get your notes on the 1511 crosscut. From station 47 north will you just read what that shows?

A. That is the area as I understand you want what is colored as the Rainbow lode with the Jersey Blue, coming down to there, isn't it?

The Court: What you found in the crosscut.

Mr. Gray: I just want the crosscut, what you found in the
1481 crosscut from station 47 north—not your conclusions—just what your notes are?

A. I have a whole lot of assays showing the values, and I have a very distinct blue streak at—a little back of the position shown by this blue streak.

Q. That is on exhibit 23?

A. And running easterly and westerly and dipping south 88°, a distinct streak of clay running through the ore.

Q. What is its course?

A. East and west. All I have here is "E. W."

Q. Did you take it exactly?

A. Yes, I did and marked it "E. W." I wouldn't have done that if I hadn't.

Q. What is its dip?

A. Dips south 88°. It is not a vein.

Q. I am asking for the facts and you are giving your conclusions.

A. I am trying to give the facts as I interpret them.

Q. Have you got it down in your notes that it is not a vein?

A. It is not a vein where I marked it in blue; that means gouge.

Q. Anything running parallel to the gouge?

A. Solid gouge, forty feet—one of these numerous streaks that comes through the ore, a few inches in width.

Q. You say, Mr. Wiley, that it is impossible here to dis-
1482 tinguish the Jersey Blue vein going through the Rainbow lode?

A. I certainly do. There is also a very distinct blue streak on the hanging side not shown on this exhibit, which is the gouge, which is upon the hanging wall of the lode. Further I have been here to the ninth floor. There are numerous slips through that ninth floor which is today accessible, running from there to the east—way to the east end and shown—not shown at all upon these exhibits, and they are the streaks which are a continuation, to my mind, of the streak of clay cut in the crosscut and which is here connecting and turning off to the south and has been called the Rainbow lode.

Q. Do you *you* feel that is responsive to my question?

A. I feel that is an explanation I would like to make in order to give what I believe to be the facts.

Q. Mr. Wiley, in your direct examination you said that in your opinion it was quite probable that the Jersey Blue vein extended northwesterly to the Jersey Blue shaft?

A. I said that it was entirely possible that it did; that I did not know where it extended in that direction because there was no development.

Q. At the time you so testified did you know it had been developed by trenches on the north from the Deadwood gulch to that shaft?

1483 A. I did not. I know that there are some surface openings up the hill.

A. Had you heard that it had been so developed?
A. Some recent work?
Q. Yes.
A. No, sir, I had not.
Q. You did not know that after Mr. Finch testified that there was some work put upon the ground?
A. I did not.

The Court: You are speaking of the development of the extension on the strike?
Mr. Gray: Yes, from the creek bottom to the Jersey Blue shaft.

Q. Mr. Wiley, going back again to the 1300 foot level where we left off the other day and where you will recall you said the plaintiff's map was all wrong, before you testified the other day were you on the second floor of the Black Rock stope just easterly of the point where you say plaintiff's map is all wrong?
A. I was.
Q. Were you on the third floor of that stope just east of that point?
A. I was.
Q. Won't you describe what was shown crossing the Rainbow lode on the second floor just east of this place where you say the map—east of the shaft there on the stope?
A. I did describe that in my direct but I will describe it again.
On plaintiff's exhibit 22, map of the 1300 foot level of the
1484 Black Rock is shown a projection just east of the *letters* "1304"—it is not marked but that I presume is meant to represent the bottom of the Black Rock raise, the long raise which extends from the surface down to 1300 feet and has its bottom on the sill floor.
Q. Mr. Wiley, do you understand the question?
A. That is a necessary statement in order to describe the location of that second sill because it is not shown at all.
The Court: Proceed.
A. 55 feet west of this point—now, that is the only reason, so as to locate it.
Mr. Gray: Very good.
A. 55 feet west of this point measured along a drift which has been run and which is not upon this exhibit, you come into the second floor above this sill, fifteen or sixteen feet vertically above the top of this level.
Mr. Kremer: Did you say 55 feet east or west?
A. 55 feet east of this point.
At this point there is a stope extending across vertically across this level and some 52 feet in width. On the northern side of this second floor is a very distinct gouge, which has been followed from the Jersey Blue vein along this drift 55 feet.
Q. Which you describe as the hanging wall gouge?
A. That is the hanging wall of the vein or lode, of the one lode which, in my opinion, exists at that point.
Q. Now, if you will just get to what I asked you?

1485 A. South of this point at the other end, 52 feet across, is another distinct gouge, the foot wall of the lode. At intermediate points, one about 20 and the other some 30 feet south of the northern wall, are two little mud slips, the one of them at 30 feet, the more southerly—of course you can find other slips, but those are the only ones I noted.

Q. The one which is southerly, that is the one I want?

A. The southerly one is a slip in the solid ore, just a crack with the solid ore on either side. There is no evidence of anything else, except there is a very distinct gouge or mud slip, in the middle of the solid ore. The ore on the other side has the massive structure of the replaced granite; there is no banding or anything like that parallel to the clay or the mud that is in there. This slip extends in a direction nearly east and west, about north 85 west. It dips toward the south at about 75 degrees on this particular floor.

Q. And the sol-d massive rainbow zinc ores are right up to this mud slip?

A. The solid Rainbow ore comes up to this slip. This term solid would need explanation, especially solid massive; the mass in which the ore occurs is 51 feet wide, and is not always the same; in places it is much richer than in others, and in some places there is some of the granite not entirely replaced still in the stope.

1486 Q. Now, just give the width of this little southerly mud slip?

A. That is from two inches, and possibly you might find some places as wide as six inches, as it was shown at that time.

Q. The mud?

A. At the time I saw that sill, this clay and mud, which is really what it is, yes.

Q. Was it somewhat like the gouge that you have introduced here as coming from the Jersey Blue vein?

A. No, not——

Q. With fragments of ore and vein matter in it?

A. In going through the ore it would be very likely in places to have fragments, although I don't remember noticing any; it is very likely.

Q. It impressed you as being simply a mud seam, with very likely——

A. Very likely—I would expect at least that it would in places have distinct particles of ore.

Q. Now the one that is more northerly—you said there were two?

A. That is a rather smaller slip, and I think perhaps not as continuous as the one which lies to the south.

Q. And you desire to be understood as saying that in both places where you see those so called mud slips, the vein material of the Jersey Blue cannot be observed, banded parallel to the so called mud slips?

A. Absolutely not banded——

1487 By the Court: Where shown in the roof or the back?

A. In the end.

The Court: You may finish your answer now.

A. Absolutely no banding except as you may have banding in the Rainbow lode itself. This second floor is not in the top, and you cannot see the solid material above, because it has been excavated up in places to the third floor, so what you see is looking straight ahead in the western end of the stope.

By Mr. Gray: You can also see it in the eastern end, can't you?

A. You can trace this particular mud slip back toward the east, and they have at this point followed along the side—not in the end, but along the side of the end, if I may use that expression.

Q. That makes it very clear. Isn't it observable both in the eastern portion of that stope on that same floor and in the western face?

A. In portions yes. Not in the eastern end, because the end has been excavated immediately opposite the western portion.

Q. Now, were you describing the second floor just above the sill floor?

A. The second floor.

Q. Now, will you go back to the first floor above the sill floor; I think they call that the second floor; I am not sure.

1488 A. The first floor above the sill is seven feet ten inches lower than the floor I have described.

Q. You were just describing the floor on which this little drift on the hanging wall seam was run?

A. I have been describing the floor on which the drift on the hanging wall was run.

Q. That is the second floor. Now, did you get onto the third floor and observe this mud slip there?

A. I did; I went all through that stope where it is accessible.

Q. Won't you describe the third floor and what you saw there?

A. This stope is heavily timbered; it is caved in places, largely due to the fact of the existence of these mud slips, at least partly due to that, and the third floor does not show nearly as distinctly as the second, but I have seen what I believe to be this same slip on the third floor.

Q. And how wide is it there?

A. About the same as on the second.

Q. Dipping in the same southerly direction?

A. Dipping slightly to the south, yes.

Q. And, as I understand it, it is east and west there according to your observation?

A. A little bit north of west.

Q. Mr. Wiley, I want to hand you exhibit marked EX and ask you if that piece of gouge shows fragments of vein matter?

A. It does.

1489 Q. Plainly?

A. I observe plainly what I believe to be vein material.

Q. Would you say then that that was a post-mineral gouge?

A. If these particles are mineral, I would, yes.

Q. Just examine them so that you may know?

A. They have all the appearances, but I would have to break them to be sure. I don't know whether I can tell that.

Q. I have no objection to your doing whatever you did to determine in the other instances.

A. There is mineral through them, yes. I would call them post-mineral, yes.

Q. Just assuming at this time that that comes from the Deadwood vein, so-called, would you believe that a branch of the Black Rock had extended through the Deadwood vein?

A. The Black Rock fault is not the only fault in Butte. There are several hundred others. I wouldn't believe that, not necessarily.

Q. Is there any more reason then, based upon the character of the gouge for judging that it is the Black Rock fault that courses through the Jersey Blue than it would be for believing that it was a branch of the Black Rock fault that courses through the Deadwood?

A. Based upon the character of the gouge, the fact that most gouges contain particles of mineral, certainly not.

1490 Q. So that does not show that the Jersey Blue vein is of the same age as the Rainbow, does it?

A. It shows that there has been movement along the Jersey Blue; in other words that there was a Jersey Blue fault, a distinct thing and separate thing from the Jersey Blue vein.

Q. Now, if you will just read Mr. Wiley my question, please?

(Question read as follows: "So that does not show that the Jersey Blue vein is of the same age as the Rainbow, does it?")

A. No, it does not, alone.

Q. Mr. Wiley, look at the exhibit marked BX, examine that and see whether you find fragments of vein material or ore in that gouge?

A. That is largely altered granite, but there is gouge through it, and there are fragments of ore with it, yes.

Q. Would you say that that is a post-mineral gouge?

A. Well, I would say there had been movement along there since the deposition of the ore, yes.

The Court: Are you putting these in evidence?

Mr. Gray: I will identify the exhibits. The one marked B4——

Mr. Dickson: I have no objection to your stating now where they came from.

Mr. Gray: I can't state definitely except the one. I think I can identify that as from the Deadwood. The others came from

1491 the Jessie, the Blue veins and other veins which Mr. Wiley will recognize as of the northwest series.

Q. Just look at the other samples, one is marked B, C and A, and see if these gouges also contain what you identify as fragments of vein material or ore?

A. B is not so much a gouge as it is a breccia. There are broken particles of iron pyrite, some ore doubtless with that, through it. It indicates fault movement after the mineral had been deposited, yes. What is the next one?

Q. "A."

A. "A" is very similar to "B." There is not the distinct clay gouge at all through it, but there is a brecciated matter, broken

particles of ore, so of course the ore was broken after it was formed. It was not formed in that shape.

Q. And "C"?

A. "C" is a dried gouge. There are particles through it in the same way.

Q. "G" and "F"?

A. "G" and "F" are similar. They are quite dissimilar—especially "F"—to the most of the gouges I have seen in the Jersey Blue and Black Rock.

Q. And both have pebbles and vein matter in them?

A. They both have and there has been movement after the formation of the ore in each case.

Q. Referring to Mr. Searls' map, Mr. Wiley, you stated that in your opinion conditions here were different from what they
1492 had been along the Rainbow and more westerly in direction; did I so understand you?

A. I simply used the map to show that the same branching condition which existed on the surface of the Black Rock claim appears upon this exhibit further to the west.

Q. It also shows the same faulting of the northwest veins as is claimed by the plaintiff, does it not?

A. It does.

Q. Now, you referred to the fact that some of the workings on the mill, below the Black Rock claim, near the southeast corner, further confirmed you in the view that the vein crossed through the east end line, and you referred particularly, as I recollect it, to the 300 foot level?

A. I did.

Q. In that level, where does the vein cross; which line of the Black Rock claim?

A. It crosses no line of the Black Rock claim. There are two veins on that level, one of which crosses the side line of the claim and the other one crosses the end line of the claim.

Q. And how wide is that vein on the 300 foot level where it crosses?

A. It is a large vein, in excess of fifty feet in width.

Q. And it crosses vertically beneath that, doesn't it, beneath the north line?

A. It crosses the north line but it dips in a southerly direction so that in depth it is entirely beneath the Black Rock claim
1493 and as shown, with the other branch of the Black Rock claim which crosses the easterly end line.

Q. You gave as an explanation for the fact that the surface ores of the Jersey Blue had not been oxidized to the depth that the oxidization had gone in the Rainbow, the vein that they may have been emerged in water, submerged in water in that vein, Mr. Wiley?

A. I did.

Q. What kept the water in the vein?

A. It didn't all leak out at the bottom is the only thing I know.

Q. Why didn't some of it leak out at the sides; isn't it the gouge and the walls that keep the water in a vein and keep it a wet vein?

A. Why, I simply—water——

Q. Just answer that question and then explain if you wish?

A. No. Gouge, impervious clay, will prevent water from leaking through a vein, yes. That is not scientific, it is just a miner's idea.

Q. Well, you are a scientist as well as a miner. Do you think there was enough difference there in evaporation to have accounted for the difference in oxidization?

A. Why, certainly at that particular place. It is true that the elevation in the gulch at the west end of the claim is no greater than the elevation of the hill—that is of the vein farther to the
1494 south, to the easterly end, it is very materially less than up at the Elm Orlu shaft and in the upper workings of the Elm Orlu.

Q. And you think there was water enough in that gulch to have made this difference in oxidization?

A. Well, that don't apply since the settlement of Butte. That was some thousands or millions of years ago I presume, that water began to have its effect on that vein.

Q. And you think the gulch was eroded down in that time?

A. I think the hill was higher up, that is sure, and the gulch was also higher up.

Q. And that the relative contours were identical?

A. Not by any means identical.

Q. The same, approximately?

A. The hill has eroded the same as the gulch has eroded.

Q. And the explanation concerning the immersed or submerged vein was simply made by you more or less as a guess?

A. That is one of the things I have found in many instances is true, that the surface ores are richer than they are at lower elevations, in gulches.

Q. Now, about this Pyle vein or Pyle strand. Mr. Wiley, when was it that you were last in Butte before your present visit?

A. About three months ago.

Q. To what point had the 804 west drift on the Pyle strand been driven at that time?

1495 A. I can't tell you. It had been driven some distance west of the Pyle raise but I don't remember how far.

Q. How long, to your knowledge, had the work been going on from the Pyle raise on the 804 west drift?

A. I can't say except that the Pyle raise itself was there some two years ago.

Q. How far has this 804 been driven in the last thirty or forty days?

A. I can't tell you that.

Q. You can't approximate it?

A. No.

Q. It has been going much more rapidly than it was before that time?

A. I think it has not been going very rapidly at any time, but I don't know just exactly.

Q. Have you examined that drift to ascertain whether it follows this Pyle strand?

A. It follows a vein.

Q. Mr. Wiley, don't you understand the question? Does it follow the Pyle strand which has been referred to, not only by you but by the other witnesses, throughout its length—this 804 drift?

A. Yes, with this explanation: that there are apparently some two spots I remember a little vein matter going off on the southerly side of that drift.

Q. Where is that with reference to where they bent the drift northerly?

1496 A. Well, I suppose you bent the drift northerly. I don't know.

Q. I beg your pardon, but before we go any farther—you say you supposed we did it. Upon what is that information based?

The Court: If this is Black Rock say so and if it is Elm Orlu say so.

The Witness: It is in the Black Rock mine. I have simply been informed that you were doing the work, that is all.

The Court: Never mind; proceed with the question.

A. There is vein material showing in the side where it makes the bend and there is vein material showing in the side a few feet farther on.

Mr. Gray: Now, won't you describe the character of the vein that was left where this bend was made near station 1151 in the westerly or southern wall of the drift?

A. I can't describe it because it was not developed except as you can see it on the side of the drift.

Q. Well, as you saw it?

A. I believe, not only from what I saw here, but on the other levels that this Pyle strand branches; that there is a portion of it that goes off in that direction, yes.

Q. And how thick or wide is that portion of it which is left and which goes off in that direction?

A. Well, that is a good strong vein still.

1497 Q. Well, now——

A. It shows its width at that point. I don't know—I have no exact location, but I should say two or three feet in width.

Q. What do your notes show?

A. I have no notes that show that exactly.

Q. How wide was this say that follows northwesterly from that station?

A. The vein going northwesterly is still a rather strong vein until you reach the face. There it is five inches in width.

Q. From the place where you left it, in the strong vein that goes out through the southern side of the 804 drift, at that point how thick is the seam that you find, that you followed, or that was followed northwesterly from station 1155?

A. It is five inches in the face, and larger as you go toward the east in the drift.

Q. You cannot state about the point where you say this branching occurs, what its width is?

A. No, except that it is very much greater than the width in the face.

Q. Would you say it is a foot?

A. As I recall it, it would be more than a foot, yes, sir.

Q. You in describing the Pyle branch and pointing out to the court how tortuous you regarded it in its strike, did not refer to the fact that a large vein courses on through westerly in about the same direction as had been followed from the Pyle shaft to station
1498 1155, did you?

A. I don't know that any such vein courses in that direction; I do know that there is some vein matter going off on the left hand side of that drift; that is all I have seen.

Q. Section 25, Defendant's Exhibit 87; or Section 25 in the block model, but I believe the map section is plainer.

By the Court: Are these sections identical?

A. These are both number 25 on the map and on the block model, yes, sir.

By Mr. Gray:

Q. Are you responsible for the projection of this so called Pyle strand on Section 25 in the curve that is shown there?

A. I did not make that map, but I have explained on another section that I believe the Pyle strand will go in that direction. That information on that section is doubtless based on information that we have on an adjacent section.

Q. How far away?

A. The next section that we have is 200 feet from there.

Q. What justification is there for painting it from the Elm Orlu 500 up to the point where you united with what you call the Black Rock Elm Orlu vein on co-ordinate line 59?

A. In the Elm Orlu 500 foot level there is a short raise
1499 which was started up, and it has an inclination to the south of about 52 to 55 degrees.

Q. What has?

A. The raise that was put up. This representation is based doubtless partly upon that development.

Q. What is in the raise?

A. It follows up upon a slip.

By Mr. Dickson:

Q. That raise as it goes up, does it go to the north or to the south?

A. It dips to the north as you go up; that is, the vein dips toward the south in its downward course.

By Mr. Gray:

Q. What is in this slip?

A. It is there just a clay slip; there is a little quartz in it in places.

Q. On what section is it that you get this curve that you have portrayed on Section 25?

A. The Pyle raise working is shown on Section 28, which is 300 feet from 25.

Q. And it is upon that working, is it, that you are able to project this Pyle in the arc like shape that you give it on Section 25?

A. That is partly the data.

Q. Now, here is section 28 on the map. Will you explain to the court your justification for attempting to pull the Pyle raise back to the north on section 28?

A. I have made no attempt to pull the Pyle strand back; I have simply endeavored to trace it where I believe it goes. As
1500 shown upon this section 28 and as shown upon plaintiff's section, there is a dip, general to the structure, which shows a bellying as you go down, that the veins which have dipped southerly from the surface down are dipping northerly in the deep; or reversing that, if you are following the vein upwards from below, it would be a reasonable assumption to expect that they would turn and dip the other way as they approach the surface, and this evidence, in connection with the fact that on the Clark tunnel we have an actual cross cut clear across the Elm Orlu claim, and that in the Elm Orlu claim there are only minute slips which cannot in my opinion in any possible way be correlated with the vein below.

Mr. Dickson: With the Pyle branch?

The Witness: With the Pyle branch of the vein below—that you have an absolute development on the 450 level, consisting of a drift which shows a vein, small, but having a distinct dip of 65 degrees toward the south; that on the Clark tunnel at a point—that we have this one in the 450 where we last see the vein extending upward with a dip of 65 degrees,—that it will not only reach this point, and it is the only one in the Clark raise which in my opinion can possibly be correlated with it; but that line so drawn is substantially a line parallel to the dip of the main line, the Rainbow lode—all these evidences lead me to say that it is probable that the upward
1501 extension of the Pyle strand is found in the Clark tunnel in drift No. 4 as indicated.

Q. All right. Now. Now, what is the dip of this vein that you have in the Clark tunnel that you refer to?

A. Almost exactly vertical.

Q. Now, let us just start at your Clark tunnel and go downward and see if we can project it on the same theory that you projected it upward from the deep on.

A. If we project it in a vertical direction it will go in a vertical line above those points. I will say still further, entirely in your favor, beneath those points you will surely find a little seam. You cannot run a cross cut anywhere in Butte without being very likely to find a little seam, and many little seams.

Q. And one seam running into another?

A. Yes; it makes it extremely difficult to correlate these small seams.

Q. So you can come pretty near following from one vein to another pretty near anywhere in Butte on some sort of a fracture?

A. Well, I don't quite understand what you mean.

Q. All right; I will not press the matter further than your other answer. Now, in making this correlation, did you do it because you thought it was necessary to find something at or very near the surface to correlate your Pyle branch to?

A. If I found it necessary—I simply have observed that these veins continued, and if it did continue, there was a vein, and
1502 the only vein which I could possibly correlate with that below.

Q. Now, you gave the course of that Pyle strand on the 450 in your direct examination, Mr. Wiley?

A. I gave the exact course, north 32 west, of that Pyle strand, as I saw it in the top of the raise while it was being run.

Q. Give me the 450. Drift 455 is where?

A. Here.

Q. That extends from the Pyle raise——

A. From the Pyle raise to the Pyle raise; there are two sections of it, 106 feet apart.

Q. And, Mr. Wiley, doesn't that drift between them run on the Pyle strand?

A. That does not follow the Pyle strand. There is a slip following nearly in the direction of the drift, but the vein which was in the raise below, at least the larger portion of it, has departed to the northwest.

Q. Isn't it true that there is continuous vein as shown on that model, from the top of the Pyle raise at 455 to the bottom of what you call the Pyle raise going on up to the 500 Elm Orlu?

A. In this way——

Q. Can't you just say yes or no and then explain?

A. No, I cannot. I think I should explain.

Q. All right.

A. This model has the same detail as the map shows, that it is a blue streak extending all the way through that drift, corre-
1503 sponding with the slip that I have described, but that the red streaks corresponding to those in the raise below are shown upon this model the same as they are on the maps; they are small so that they cannot be seen very fully, but they run in a northwesterly direction.

Q. Your map does not show any continuous blue streak from the Pyle raise at the top of the 450 to the bottom as it rises on there?

A. There is a small narrow blue streak drawn along there. As a matter of fact on this particular map it does terminate right there, and there is another one shown going on from there.

Q. But there is no continuous mineralization shown on your map, exhibit 67, along that drift, is there?

A. There is not continuous red.

Q. Is there continuous blue or any other color?

A. Yes, continuous blue, only with the explanation that the blue line drawn on the south side that I now indicate terminated there, and another blue line is shown immediately to the south.

Q. How far from there along the drift is it shown without mineralization on your exhibit 67?

A. The distance between the end of this streak and the side where it comes in.

Q. From point to point, from the place where you have blue to the place where you again have blue?

A. It is about seven feet.

Q. Seventy feet?

1504 A. No, seven feet, just seven.

Q. Along that drift you say that only seven feet of the drift did not follow vein as shown by your exhibit 67?

A. Yes. Look here; isn't that right?

Q. I am simply asking you?

A. Well, I don't want you to say seventy when I said seven.

Q. I misunderstood you, that is all. For seven feet along there you say that the drift did not follow vein matter or vein?

A. I said the distance between the blue streak shown on the map to the other blue streak is seven feet.

Q. Is the map correct?

A. Substantially so, yes. It does not follow a distinct vein; it does follow some slips which are plain.

Q. Where is this raise that you speak of where you saw the Pyle two sets above the 450, was it; where was it that you saw the raise two sets up where you got its course?

A. That was about 30 feet below the 450 in this raise.

Q. That is the same sort of divergence that was followed out on the 800 from station 1155, isn't it?

A. Except that the main vein has gone in a northwesterly direction in the 450.

Q. But not on the 800?

1505 A. I don't know there without further development.

Q. Isn't it just as open to observation as the workings there at the 450?

A. It is more so as it stands there, because the drift is not caved.

Q. Mr. Wiley, on the Clark tunnel level, this vein that you attempted to correlate with the Pyle in drift No. 4 on the tunnel level, what is the size and character of that vein?

A. That drift is rather closely timbered, so it is rather hard to say, but there is a small vein extending through there; not a large vein.

Q. Give us your idea of the size of it; is that as close as you can describe it?

A. Well, that is about all; the drift is closely timbered, and that is the fairest way. You might see it six inches wide, and yet if the timbers were removed, you might find it larger.

Q. What is its course?

A. Northwesterly.

Q. And follows along the drift?

A. Yes, except that there are slips which go out of the drift also.

Q. If they were projected on the course of the drift northwesterly it would come in near to the end of No. 25 drift, wouldn't it?

A. It would probably; if it continues that far, reach a point north of the 25 drift.

1506 Q. That is, if projected on the course that it is now going, the drift?

A. The drift is not straight; if you take the entire drift from end to end, it will project about there; but if you take, as you should take, that portion of the drift which runs in a northwesterly direction, it will go north of drift 25, and at that point where it would go there is a distinct streak shown in the cross cut.

Q. That is in this cross cut, what is its name?

A. In the cross cut immediately under the letter "L" in the word "Elm"; there is a distinct quartz streak shown there, exactly where this would go if it kept straight.

Q. You think that is a reasonable correlation, do you?

A. That is entirely a possible correlation; that is as far as I would want to go.

Q. It is true, however, that this vein as it is disclosed in drift 4 east and west of the Clark cross cut, is not straight; it does wave more or less upon its strike?

A. It is not perfectly straight.

Q. So that it is not at all impossible and improbable that it would join in the slip that is shown in 25?

A. The slip that is shown in 25, if I may state it in that way, is of such different nature that I do not believe it possible to connect them.

Q. On the 900 Black Rock, is this the Pyle strand shown there?

A. It is, yes.

1507 Q. And its course?

A. Its course is a little north of east.

Q. You think that is the same vein that is disclosed in the 800, do you not?

A. I know it is in the raise, yes.

Q. And in the 450?

A. Because the raise has followed it all the way from the other level.

Q. And the 450?

A. Yes.

Q. On exhibit 85 in the Jersey Blue vein I call your attention to the fact that it is portrayed for a considerable distance from the surface, and at least to the 400 level it shows gouge upon both walls; that is true?

A. Yes, that is true upon the exhibit.

Q. And for some distance below the 400 level?

A. It shows the blue on the north side all the way; it shows blue on the south side for a short distance below there, yes.

Q. And then it does not show blue from a level a little below the Elm Orlu 800 down to the Elm Orlu 1000?

A. That is true in that undeveloped section.

Q. What have you to say as to the map correctly portraying the conditions found in the ground?

A. Well, I can say that the map correctly portrays the conditions found in the workings where it is cut; that the continuation
1508 of this condition between those workings is an assumption, based upon what has been seen, that is all.

Q. So that at least down to some hundred feet below the 400 level in your judgment the workings did disclose such a condition as to justify the placing of gouge upon both walls of the Jersey Blue vein?

A. Yes, there are gouge streaks there, other than the main one on the hanging side.

Q. You also show on exhibit 86 for a considerable distance from the surface gouge upon both walls of the Jersey Blue, do you not?

A. Yes.

Q. And on exhibit 88 you show it on both walls from approximately the 300 foot level of the Black Rock shaft, do you not?

A. Yes, if I may explain.

Q. Go on; I have no objection to your explaining.

A. Simply that these blue streaks are shown upon there where there are workings, where they are actually seen. In the case of a vein where you have a gouge on one side it is assumed to continue; but there are many gouge streaks, many blue streaks, doubtless, in the mine, which are not shown, although there are, for instance upon this cross section eleven different blue streaks shown deeper down.

Q. On the 1100?

A. Yes; it is simply illustrating the condition that there
1509 are gouge streaks other than the main one on the hanging side.

Q. We are speaking of these upper levels where the veins are not so close together, and you show the same condition where you show the Deadwood there, where the gouge is on both walls?

A. We show gouges in the same way, no matter where we find them, by blue marks.

Q. Now, here is a working, Mr. Wiley, on section 25, exhibit 87, in which you say the information is very meager from which that section was made and the projections were made?

A. Well, the workings—the picture shows for itself that on this immediate line there are not extensive developments; but for instance section 23, 200 feet away, has extensive developments.

Q. Why is it that on section 23 you put so much gouge on the Jersey Blue, and when you get to section 25, where you say there is practically no workings, you only put gouge on one wall?

A. Well, it is true that the blue has not been continued although it is shown in the workings above.

Q. Yes, it is shown on the Black Rock tunnel there.

A. It is shown drawn through the development. To be correct, that should be extended a little bit lower down.

Q. How much lower down?

A. Well, that I don't know from the actual development, but I would extend it and make it similar in that regard to sec-
1510 tion 25. It is not always found upon the foot wall, that is upon the south side, and it is always found upon the north

side. The same remarks would apply to the vein; we don't know just what the width of the vein is right through there, but we draw it at the average width where we have seen it.

Q. What is this blue strand extending from the north line of the Black Rock claim to the Deadwood vein across this part here—there are no stations there; you know the one I mean; it is the Blue strand on the northerly side of the ore body, on the most northerly ore body on exhibit 77?

A. It simply represents a gouge upon the northern wall which is observed in the stopes.

Q. Is that a strand of the Black Rock fault?

A. That may or may not be.

Q. You observe it is indicated as being displaced or faulted by the Deadwood vein; does that accord with your observations?

A. No; as a matter of fact, I have never made any observations. It is not on the level, it is up in the stopes and I have never been there at all, but if you wish me to explain the reason, I can do that.

Q. I want to know if in your judgment it is faulted by the Deadwood vein?

A. Well, probably not; it may extend beyond and go right through, but that is utterly unexplored territory; it may not extend as far as that. It is evidently seen in the stopes and in this
1511 crosscut. It has been extended to the west, and it may extend still further. Nobody has ever seen that, because it is out in the unexplored country.

Q. Referring to exhibit 82 I observe on that that you disclose from station 269 to—well, there is no station—on easterly, on both sides of the ore body, gouge on each wall?

A. That is correct.

Q. Does that correctly show the conditions in the ground?

A. As near as I have been able to see them, yes.

Q. Referring to exhibit 68; from what information do you project the Jersey Blue or Black Rock vein upon that exhibit?

A. From the fact that the Black Rock raise, 1300 feet in length, goes right through this horizontal plane, and that the Black Rock vein is developed above and below, extending on its strike beyond the raise. It is dotted to show that it is not actually developed, and there are no workings, of course, to show its direction, except the raise itself.

Q. You have been through crosscut 1115, Mr. Wiley?

A. I was in there once, but it has been caved.

Q. Have you your notes?

A. That has been caved for a long time, I know. I have some notes so I was in there probably in April, 1914.

1512 Q. From your notes just describe what there is shown in the 1115 crosscut?

A. I know—I have no detailed notes on that except that it is generally through granite and at a point 110 feet south of the stope it cuts a northwesterly fissure extending vertically and at a further—scaling forty-eight feet it cuts another northwest fissure dipping sixty

degrees to the north. Beyond that it is in granite. There are a multitude of small seams and things of which I made no note.

Q. The large fissure that you saw in there, just describe it, won't you?

A. I haven't its size noted, and I don't recall except that I have marked that a distinct cross fissure.

Q. Did it have any ore in it?

A I don't know.

Q. If it had ore in it you would have mentioned it?

A. If it had been plain I would have colored it red. I have colored it blue.

Q. Both of them are colored blue in your notes?

A. Yes.

Q. And those are the only two you found in there, in the face of the crosscut?

A. These are the only ones of any prominence.

Q. Have you ever observed the Deadwood vein south of the Black Rock fault?

A. Yes.

1513 Q. Just describe it as you have observed it—first did you observe it on the 1100 foot Black Rock?

A. No. That does not mean it does not exist at all.

The Court: What is that?

A. That does not mean, because I didn't observe it, that it is not there. In fact I know in many cases it is there without being able to see it in detail. The timbers are so crushed that I have not—in this particular case I have observed what I call a portion of it in the face of the stope extending westerly from near the northerly end of this 1115 crosscut.

Mr. Gray: Just put your initial "W," there where you saw it?

A. That crosscut has reached—that point rather—there was being work done there at the time I was there and it had just reached a south strand, a south wall in the end, cutting off the ore, which I believe to be the Deadwood fault, or at least one branch of it.

Q. Where is it on this 1115 crosscut, Mr. Wiley?

A. Probably one of the slips which I located—which one I do not know because it was not developed.

Q. That is the same fissure that is being mined north of the Black Rock fault on the 1000 foot, one set wide.

A. I think it is.

Mr. Gray: I think that is all.

1514 Redirect examination.

By Mr. Dickson:

Q. Speaking of sulphide ores being near the surface in some places in the Jersey Blue in your judgment than they are to be found in the so-called Jersey Blue lode, I will ask you if in one and the same vein it is at all unusual to find sulphide ores, unoxidized ores, nearer the surface in some places than it is in others?

A. It is almost universally the case that sulphide ores are nearer the surface in portions of the vein than they are in others.

Q. And that would be accounted for, I suppose, from the fact that where you find the sulphide nearer the surface there has been less freedom and opportunity for surface waters to circulate downward in that section?

A. There have been, of course, less oxidization and that is very materially sifted by the downward circulating waters.

Q. Your attention was invited on cross examination to plaintiff's model, exhibit 101, the 300 foot level near the east end line of the Black Rock claim, and you spoke of two branches or stringers or strands of ore found in that 300, one of which went over to the northerly side line, as I understand it of the claim. Am I correct?

A. You are.

Q And the southerly strand, where does that go?

1515 A. That is, in my opinion, the branch which crosses the east end line of the claim.

Q. When were you last in the workings shown upon exhibit 71 and on which the figures 804 appear, and marked above that "Pyle vein"; when were you last in there?

A. About a week ago.

Q. Calling your attention to exhibit 67 and to the drift running westerly from the Pyle raise to the crosscut 451, what have you in the way of mineralization in that drift, apart from the mud slips or fault slips or clay slips?

A. The mineralization which is in there consists of quartz running in a northwesterly direction in several different places.

Q. And apart from where you had the quartz running in a northwesterly direction, state whether the slip is barren itself?

A. It is a barren slip.

Q. What is the marked difference between what it was disclosed in the 4 drift and the 25 drift that in your judgment would make it unreasonable to correlate the two?

A. In the No. 4 drift you have what I would call a simple vein; there is mineralization. In the 25 drift you have a series of little blue fractures, none of which in my opinion constitute a vein.

Q. Were you in part of the 1300 foot level since you left the stand on Saturday, Mr. Wiley?

1516 A. I was, yesterday.

Q. What part of the 1300 foot level did you visit yesterday?

A. The sill floor and the second floor, stopes fifty feet east of the Black Rock raise.

Q. To what extent did you examine that second floor east—east or west was it?

A. East of the Black Rock raise.

Q. Had any timbers been taken out there on that level east or west of the Black Rock raise so that you were able to go through—that is entirely across the vein and as disclosed on that level?

A. Timbers from the top of the sill floor had been removed im-

mediately south of the Black Rock raise and extending from the Black Rock raise to the south side of the sill.

The Court: Is this the wet raise?

A. That has been called the wet raise or the Clark raise, yes.

Mr. Dickson: The timbers being removed, as you went through there could you see the ground above or was that obscured by the timber?

A. I could see the ground in places where the timbers had been removed where formerly I could see nothing but timbers, I could now see the solid structure of the vein.

Q. Just state to the court what you observed in the structure of that roof as you went easterly from the cross raise to the
1517 southern boundary on that level, in the way of clay gouge, and different things in the structure?

A. That is the cross section, of course. Continuing the cross section we would have to assume that is the raise itself—that in the raise itself we had the hanging side of the vein, and then south of that stope we had the solid structure of the vein. That vein there is largely ore, but it is not ore exactly vertical throughout; there is a little granite mixed with it in places—not granite I would say, but what is left of the granite structure, mixed with the ore, so that with that explanation it is the solid vein, showing clear across the south side. There is no plain diagonal structure of any kind cutting through this.

Q. Now, Mr. Wiley, state whether one of your purposes in having this timbering removed and making that observation was to ascertain whether or no there was such a diagonal structure or material differing from what was on either side of it, cutting through the vein on that level?

A. It was to see what we could not see before, when the timbers were there whatever was in that drift.

Q. Just where on plaintiff's exhibit 22 was it that you passed through there?

A. Immediately north of the Black Rock or wet or Clark raise, as shown there, just east of the mark "1304."

Q. Just mark in pencil "Clark raise"?

1518 A. (Witness indicates.)

Q. Proceed.

A. The timbers having been removed from the top of the sill floor across to the south side of the vein——

Q. Leaving the roof visible?

A. Leaving so we could see the roof, whatever was in the roof.

Q. And state what you saw in your opinion that would justify the representation on plaintiff's exhibit 22 of what they claim to be the Jersey Blue vein cutting diagonally across the Rainbow lode?

A. Nothing whatever which would justify any such construction. The only difference in the solid massive ore as I saw it was the fact I mentioned in some of the places it had more of the original granite structure. The granite had not been entirely replaced.

Q. Was that where you mentioned seeing the two stopes?

A. The two stopes are shown 55 feet farther to the east in the sill above, and these slips—I saw four at that point, that is two between

the walls of the vein—one of them being the hanging wall slip, which is not shown here in blue at all.

Q. Shown on plaintiff's exhibit 22?

A. The other one lying south in the foot wall and then there were two intermediate slips.

Q. What was the course of these two intermediate slips?

1519 A. Nearly east and west; one of them was a little north of due east.

Q. State how numerous, if they be numerous, are the gouge slips or gouges shown in the Rainbow lode, apart from any faults that have been spoken of by the other side?

A. There is hardly a stope in the whole mine of any extent where you cannot see these little gouges, this clay, in the body of the vein itself. They run in different directions, generally in an easterly and westerly direction. They are in the ore and are very noticeable because the ore breaks along these slips, and there has to be extra secure timbering to prevent caving.

Q. Almost the last question I asked you on direct on Friday was if you could calculate, or by any calculation from any data observable on the ground, determine where the south branch of the Rainbow lode, so-called, would be found on the 1700 foot level of the Elm Orlu, provided it extended to that depth, and as far westerly as the long crosscut shown on plaintiff's exhibit 22, as running northeasterly from the Elm Orlu shaft. You said there were so many variations that it would make it difficult to make the calculation and you would not care to undertake it. I will ask you now if it is your judgment the Rainbow lode or the south branch of the Rainbow lode, if it extended as far westerly and to the depth of the 1700 foot level as shown upon plaintiff's exhibit 22, would fall south or north of that shaft at that level?

1520 A. It would unquestionably come south of the shaft.

Q. How far you do not undertake to say?

A. I do not.

Q. From what data do you reach that conclusion?

A. From its direction where it——

Q. Just explain to the judge; I don't understand.

A. The further fact that it has not been cut in the 1700 crosscut. I think in justice to my assertion, in continuing that I should explain that one of the large factors is that there is another fissure, called the Copper lode which comes across and I believe when this—when these fissures meet that it will be faulted, but how much I do not know.

Q. Do you find the end of the south branch of the Rainbow lode south of the Elm Orlu lode on any of the levels above?

A. On the 1000 foot *foot* level of the Elm Orlu and perhaps as low as the 1100 foot level as shown by the stopes, there is the main Elm Orlu vein, which is the branch to which you refer. That is shown on the 1000 foot level actually developed south of the shaft and it would on the deeper levels, for instance on the 1200, extend out to the south, so that on the 1700 foot level we would be fully justified in expecting the continuation downward to be to the south and some distance to the south.

Q. Calling your attention to what is marked on this model exhibit 101, "1200 E. O.," and 1202, that drift running westerly
1521 from a cross cut 1209 that does—does that follow in the vein to its extreme face?
A. It follows in th vein until its southerly end——
Q. To its westerly end?
A. To its westerly end.
Q. How far is that vein south of the Elm Orlu shaft?
A. About forty feet.

Recross-examination.

By Mr. Gray:

Q. Mr. Wiley, coming back to this vein that you say in your judgment is disclosed in the Black Rock 300 that would go through the east end line of the Black Rock claim. Whereabouts is that disclosed; has that any number?
A. It has no number. The model is not numbered. It is on the 300 foot level of the Black Rock cross cut, second from the easterly end.
Q. Can you put your initials on that white so we can have it identified—never mind. It is the crosscut?
A. It is the crosscut second from the easterly end of the Black Rock.
Q. And how wide is that vein?
A. That is a big wide vein around thirty feet, something like that.
Q. And its course?
A. As can be seen there, generally easterly and westerly.
1522 Q. Well, did you take its course in these small drifts from that crosscut; did they follow along the course of the vein?
A. They followed along the course of the drift.
Q. What is the course of the drift?
A. It is about north 75 east.
Q. Projected in that course, where would that come; which line of the Black Rock would it cross?
A. I could continue it and——
Mr. Dickson: Is it shown on any of the level maps?
Mr. Gray: It would cross beneath the north side line wouldn't it?
A. Its course as continued, as shown upon this little work, which would not be satisfactory would be as I hold my pointer. It would be very near the northeast corner of the claim at that depth.
Q. What is the dip of that?
A. At that point it stands almost vertical, but I fully believe that it is the same vein which is shown on the workings above.
Q. How far from the surface is that?
A. That is 110 feet from the surface of the collar; immediately vertical here it appears to be about 170 feet.
Q. And how far is it from the east end line of the Black Rock?
A. It appears here about 300 feet.
Q. And from the north side line of the Black Rock?

1523 A. It is a difficult matter to give that exactly but it, I should say, would be fifty to sixty feet south of the north side line, more or less?

Q. Now, Mr. Wiley, you didn't take any exact observation underground as to the course of these drifts?

A. I took them from the map only. I always take the course of the drift from the accurate transit course of the surveyor rather than anything else.

Q. There isn't any such map. Can you give me the exact course of that dip?

A. North 75°.

Q. You think that is not an unreasonable projection to project that to the mill tunnel?

A. I think, considering the development we have on the mill tunnel at this level—I think it is almost a certain conclusion that it is developed there, yes.

Q. As I understand it the course of these little slips you have in the mill tunnel are generally northwesterly and southeasterly, aren't they?

A. The general course of the main vein of the mill tunnel is easterly and westerly.

Q. With what course that you have on your exhibit 66, do you correlate that strike of this vein upon the 300; what portion of the vein in the mill tunnel?

A. The portion of the vein which I believe is the same is that portion immediately beneath the southern caved stope. This illustrates another reason—it is not simply a matter of projection but of observation—we have on the surface a caved stope plainly visible which is above the main easterly branch and developed
1524 in the mill tunnel. We have also lying to the north another caved stope just along the side line which is above another portion, so that it is the workings at the surface and the fact that on this mill tunnel the country is crosscut*ted*, not only as shown upon the map, but by recent workings, clear over to the north side line, and that this, in connection with the crosscut between the two veins but showing the two veins there—the relation of all of them is taken into consideration, in determining what vein I think to be the continuation of a certain vein in depth.

Q. This cross cut that you have just spoken of on the 300, how far is it between these two veins?

A. About sixty feet.

Q. And how far do you make it between these two veins that you say exist on the mill tunnel level?

A. What two veins?

Q. This one that goes out to the north side line and this other one you are trying to put to the east end line?

A. The caved stope on the north is about the same distance, fifty to sixty feet north of the caved stope which lies to the south. That I believe to be upon the same vein.

Q. Now, Mr. Wiley, this little drift along—which you think—or a vein that goes through the east end line of the Black Rock is below

the easterly caved stopes, where you find the station- 1143,
1525 1144, and 1118, isn't it?

A. You mean below it?

Q. Below it, yes.

A. Yes, nearly.

Q. And is west of the little fault or slip that runs northwesterly into the workings from 1119?

A. Yes.

Q. Your notes again, if you please on this. What would you say you have got the exact dip of that vein disclosed in the cross cut?

A. I have simply marked it "strong vertical."

Q. Didn't you take this dip with a compass?

A. If it appears vertical to the eye, I so note it.

Q. And you didn't take it with a compass?

A. It might vary two or three degrees.

Q. Won't you answer that question: did you take it with the compass or did you make an eye examination of its dip?

A. I have no note here as to having taken it with a clinometer, not a compass; so I presume I did not take it with an instrumnt.

Q. If that actually shows from 78 to 80 degrees south, where will it be upon the surface, what line will it cross on the surface?

A. If you assume its continuation to the surface at any certain dip, it will throw it one side or the other of a vertical position.

1526 Q. If it dips to the south 78 to 80 degrees, what line would it cross on the surface?

A. It will be north of its position.

Q. Now, if you will just answer that question: what line of the Black Rock would it cross?

A. 78°—and 140 feet—it would depart to the north 20 feet in 100 vertical.

Q. Well, it would cross the north line, wouldn't it?

A. Come just about on the north line.

Q. Where, at the corner, do you mean?

A. No, not this position. If you assume a dip of 78°, as I now hold my pencil, and extending up to the surface, it would come just about on the Black Rock side line.

The Court: Where is that on the plane map?

The Witness: It is not on there; the workings are not on there.

Mr. Gray: You might put your initials here and then we will have it on exhibit 10, the cross cut to which we have been referring.

(Witness indicates.)

Q. You have marked the initials "W. H. W." on this cross cut, exhibit 10, what you have been referring to on the model?

A. I have.

Q. Now, on the plan map there, it is so much easier to show it, can't you just project that on the course of the drift northeasterly?

A. It is a very short drift.

1527 Q. You said it showed the course of the vein?

A. I see that I have been wrong in the assumption that it

followed throughout its length in the vein. Assuming that this exhibit is correct——

Q. I don't ask you to assume it; I ask you to project it, based upon your own observation.

A. The red line as shown upon this exhibit continued in the direction shown would be shown by the pencil line I have marked.

Q. Just put your initials on the end of that pencil line, can't you, and also on the point where it crosses the north line of the Black Rock; just put your initials there?

(Witness indicates.)

Q. Does that accord with your observation?

A. It does not, except that if you continue the direction as shown on that particular working, on that mathematical line, it will be where I have indicated.

Q. You said that that working had approximately the course of the vein, didn't you?

A. The working does likely give there the direction of the vein.

Q. As far as it is disclosed any place upon that level, it is disclosed in that drift from that cross cut, isn't it?

A. It is.

Q. Then if the vein be continued in the course which it had when you saw it it will actually cross the north side line of the Black Rock claim?

1528 A. At that particular level; but this is not the surface of the claim.

Q. You said that as you saw it it was vertical, the vein was vertical?

A. As shown in this particular level.

Q. Assuming that it is, as you had it, vertical, taking into consideration the contour of the ground, where will it come on the surface?

A. Assuming therefore that it is absolutely a mathematical plane, both on strike and dip, it will come on this particular line. As a matter of fact it is not and no veins are mathematical planes.

Q. And in your judgment it is not an unreasonable thing for you to assume that it would change its dip and strike as to come through the east end line of the Black Rock?

A. In this case it is not an assumption because it is actually developed on the workings above.

Q. This same vein?

A. This same vein.

Q. Show the court where you have described a vertical vein on the course as you have it; is it developed above?

A. My pencil is as near as I can hold it vertical, and it rests upon this vein on the 300 of the Black Rock, and it also touches the mill tunnel above.

Q. What is the course of that in the mill tunnel?

A. It is nearly east and west. If this vein continues in its
1529 vertical direction it will be in the mill tunnel above. We know as a matter of fact that it is. There is no development

on the level of the 300 Black Rock to the north to show what its direction is; there is development nearer the surface on the mill tunnel above.

Q. What is its course at that point immediately above in the mill tunnel?

A. It is nearly east and west.

Q. It has changed its course how much?

A. It has changed in its course about 15 degrees.

Q. In view of your last testimony concerning the reasonableness of the projection, what have you to say with reference to the reasonableness of expecting to cut the Jersey Blue vein on the 1700 and the reasonableness of the projection as shown upon section 5, plaintiff's exhibit 31?

A. The reasonableness of that projection, simply considered mathematically, is entirely a different proposition from one in which you take into consideration the observed data as you see them in the ground. You can assume a continuation; assuming that the dip of the Jersey Blue as shown above is correctly shown, that it may slightly change its dip to the south deeper; simply from the mathematical fact; but when we know that this vein which has been followed from above, as shown by the working close to the plane of the section—further away has absolutely joined and is not shown cutting through the Rainbow lode, this becomes an entirely unreasonable section. Further, if I may say in connection with
1530 this, the dip of the Jersey Blue as I have seen it above is not to the south; it is very nearly vertical, but my observation of the dip at places upon it is that it is 85 degrees to the north. That is in the level above. It is now caved. Further this section attempts to show and does show workings which are not in the same plane, and the strike is not at right angles to the plane of the section. The lower portion, for instance, has got marked "Projected 20 feet west"; "Projected 47 feet west"; "Projected 80 feet west"; I do say that under those conditions that section is likely to be somewhat misleading.

Q. You conceded on your section 25 that you had projected it 300 feet, Mr. Wiley, didn't you; the Pyle strand under that section?

A. I don't recall the point to which you allude.

Q. Not 23; it was 25. Didn't you say that on section 25 you had to take your information as to the Pyle from 200 feet away?

A. That is simply dotting a line between two observed points, to indicate the probability of its continuing between those points.

Q. Well, there are projections on every section, aren't there, and necessarily must be?

A. No, there is an entire difference between the projection used on this section, and the assumption that two points that we see are connected.

Q. One reason that you say that that is not a reasonable projection of the Jersey Blue or connection from the 1700 upward.
1531 is because it is not physically connected—is that you do not think the Jersey Blue goes through the Rainbow lode?

A. I take into consideration the fact that near this plane of section I have been able to see the Rainbow lode from side to side, and I find no Jersey Blue lode going through it.

Q. So that again there the question of the reasonableness of exhibiting the Jersey Blue on the 1700 goes back to the same disagreement that you have had in other places?

A. Well, but in this case entirely ignoring that the things shown here are on different planes of section, as much as eighty odd feet away.

Q. Have you been into the 1700, and into the drift on what we call the Jersey Blue on the 1700?

A. I have.

Q. Have you been in the raise from that drift on the 1700?

A. I stood on a pile of dirt at the foot of the raise, yes.

Q. What was the dip as shown in the raise?

A. It is about 75 degrees to the south.

Q. About as shown on exhibit 31?

A. I think that portion is as shown there substantially.

By the Court: This is that work that was put on there after the cross cut had been extended?

Mr. Gray: Yes, sir.

By Mr. Gray: After the cross cut was driven through, and
1532 the drift was driven on what we call the Jersey Blue and the raise was started upward?

A. A short raise was started, and a short drift about 15 feet in length, yes.

Q. And the dip there was what?

A. The dip as observed at that raise was 81 degrees to *to* the south.

Q. And the strike?

A. South 67 degrees east.

Q. You said something about this vein which has been referred to variously here as the Elm Orlu, and beneath the Bruce raise, and is sometimes called the new vein, and you say that if it continues southwesterly it will go south of the shaft on the 1700 foot level?

A. I do.

Q. Where will it be disclosed on the 1600 drift?

A. That I don't know, except that the 1600 drift at the point where I have my pencil at the eastern end of the only stope on that level, cuts through what I believe to be the Black Rock fault. The drift is caved, but I could find a little hole to get through there, and we do find very plain matter extending in a northeasterly direction in the direction of the fault. It is in my opinion altogether probable that the downward extension of the Elm Orlu vein, as shown in the Bruce raise, has actually been cut in that level. However, I do not want to state that as an absolute fact without additional developments.

1533 Redirect examination.

By Mr. Dickson:

Q. Mr. Wiley, is it improper, and if so, why improper, to project workings to a plane of section not at right angles with the plane of section?

A. The result, if the vein which is diagonal to the plane of section, is projected onto that section, may be a distortion. The workings are usually projected at right angles to the plane of section.

Q. Is it recognized by all engineers, as far as you know, that that is the proper projection, at right angles?

A. That is the only proper way to project workings, but if you want to project a vein, the proper way would be to project it in what you believe to be its proper direction.

By the Court: Its course as you last saw it?

A. Yes, sir.

Mr. Gray: May I ask a question?

Mr. Dickson: Certainly.

By Mr. Gray: Do you mean to say that there are any workings on there projected diagonally?

A. Oh, no.

Q. It is just the vein projected on the last observed course as claimed by the plaintiff's witnesses?

A. I presume, but it is some 80 feet away from the section, so that it is a guess.

Q. So that your criticism did not apply to this section?

A. No.

1534 By Mr. Dickson: I want to ask you about plaintiff's exhibit No. 10, where you were asked to draw and did draw a blue line showing where that vein that you referred to would cross the northerly side line on that level. I call your attention to the drift shown in that cross cut. That drift, as I understand, is on vein?

A. It does follow the vein, yes, as near as I can remember.

Q. That is, as shown upon this exhibit it is not a straight drift; it is somewhat curved in form, is it not?

A. It is curved.

Q. And you, in drawing your line, you took it as though it were a straight drift, didn't you?

A. The pencil line is continued in a straight line on the course of the drift. There is no doubt in my mind, based on the correlation above, that this turns to the right, but it is based on the workings themselves; it would bend some as it goes easterly.

Q. As to the vein on the 300 being vertical, do you think that if it had a dip of 78 to 80 degrees to the south or the north that you would have it as a vertical vein?

A. No; if there is more than five degrees departure from the vertical, I try always to measure it.

(Witness excused.)

1535 *Testimony of Albert Burch, Recalled, for Defendant.*

ALBERT BURCH, recalled in behalf of defendant, testified as follows:

Direct examination.

By Mr. Dickson:

Q. Mr. Burch, when were you last in 702 drift, respecting which you gave testimony when you were last upon the stand?

A. Yesterday.

Q. The drift upon which is marked 702 on defendant's exhibit 70. Has there been any change in the way of timbering in that drift from the condition in which it was when you saw it before you were upon the stand and when you visited it yesterday?

A. Yes, sir; at my request the lagging had been removed from each alternate set throughout the drift, so that I could observe the condition in the roof better than when I saw it before.

Q. With the lagging removed so you could make more definite observations, do you desire to make any change in your descriptions of that drift?

A. Somewhat, yes, sir.

Q. Please do so.

A. The drift which is shown on defendant's exhibit 70, being No. 702, is the one which has been driven along a gouge seam or slip. There is also for a considerable distance, about 60 feet
1536 or 70 feet, a continuous seam of quartz in the same drift, running in nearly the same direction as the gouge. The gouge cuts across the quartz at a very acute angle; an angle of perhaps not more than one or two degrees. At the east end of the drift the gouge is south of the quartz, and at the furthest point west where it is possible to observe it it is north of the quartz, having cut diagonally through it. The width of the quartz where it cuts through it is considerably greater in places than I was able to see before the lagging was removed.

Q. What do you say now about it?

A. I should say that there is one point where it is as much as 18 or 20 inches in width, and about one-half of that width is on one side of the gouge seam and about one-half on the other side at that point. All that I was able to observe before the lagging was removed was the half that was on the south side of the gouge seam.

Q. Were you in the 1300 foot level of the Black Rock yesterday?

A. Yes, sir.

Q. In company with whom?

A. In company with Mr. Wiley, Mr. Salisbury, Mr. Emmons, Mr. Bruce and Mr. Finch.

Q. Did you pass through across the width of the vein as disclosed on the 1300 foot level of the Black Rock near the Black Rock raise where the timbers have been removed?

A. I did.

1537 Q. Were they so removed that the entire width of the vein at that place could be seen?

A. The entire width as far as the workings extend. The south limit of the vein is probably not quite reached by the workings, but the entire width of the vein as far as the workings extend could be observed.

Q. How about the northerly wall?

A. The northerly wall is exposed in the workings.

Q. And for what width from the northern wall southerly were you able to observe the conditions overhead in the roof of the stope?

A. About 30 feet.

Q. And what were the conditions as to mineralization at the southerly edge of that place where you went across?

A. It was almost solid zinc ore.

Q. At the southerly edge?

A. At the southerly edge, yes.

Q. Now, as far as the stoping had extended?

A. As far as the sill had been opened out, yes.

Q. What did you observe in that roof for that 30 feet, or whatever the distance was, from the northerly wall, as you went south, as to the structure of the ore, and the difference in the structure in places, clay, gouge, and all such things as you were able to observe, as nearly as you can give a word picture of it?

A. The northerly wall is a gouge striking nearly east and west through the foot of the Black Rock raise, and dipping north

1538 at quite a steep angle, about in the neighborhood of eighty degrees; between 75 and 80 degrees. From that point southerly across the stope to the extreme limits of the workings on the south was a solid mass of zinc ore, without gouges and without slips, without any transverse structure lines observable of any kind that I could see. The only exception to this is that I saw in one place, and on one side of the slip which has been opened——

Q. How wide was that place, six or seven feet?

A. Yes, six or seven feet—there was a bunch of granite that had been only partially replaced with zinc ore.

Cross-examination.

By Mr. Gray:

Q. You were standing on the 1300 sill and looking up in a westerly direction at the raise and rocks as they came northerly toward the raise?

A. I don't just get that.

Q. Well, you stood and looked up at the raise from the sill floor, didn't you?

A. No; you can look up at the foot of the raise.

Q. You looked up at the foot of the raise then?

A. You have to climb up a little incline of one set to get up into the raise itself.

Q. Yes, but you can stand on the floor and look up at the foot of the raise?

A. Look up to the foot of the raise, yes.

1539 Q. Well, the structure of the zinc ore as it comes toward the raise dips in what direction?

A. I could not tell you what direction it dips.

Q. Is it banded there?

A. Not appreciably; it appears in more the structure of the original granite; that is to say, it is in irregular blocks; that is the appearance.

Q. Isn't there there a very evident appearance, Mr. Burch, of the ore coming down and being faulted?

A. I did not see anything that looked like that to me.

Q. It did not look like that to you?

A. No.

Q. And at the foot of the Black Rock raise, standing on the sill floor and looking up at the foor of the raise and at the ore and rocks just southerly of the foot of the raise, isn't it evident there, the bands of the Rainbow vein coming down and being fau-ted by a fault which is dipping southerly, looking west?

A. I saw nothing that I could possibly interpret in that line, or of that nature.

(Witness excused.)

1540 *Testimony of John W. Finch, Recalled, for Defendant.*

JOHN W. FINCH, recalled on behalf of the defendant, testified as follows:

Direct examination.

By Mr. Dickson:

Q. Mr. Finch, I understand from Mr. Burch's testimony that you accompanied him and the other witnesses yesterday on an inspection of the 1300 foot level where timbers had been taken out near the Black Rock or Clark raise?

A. Yes, sir.

Q. I wish you would describe to what extent the *the* timbers had been taken out where you started with reference to the Clark raise, whether at it or east or west of it and if so, how far; how far you traveled southerly across the stopes, and to what extent you had an unobserved view of what was disclosed in the top of the stopes in the way of gouge, structure and any other thing that you can call to mind; any other observation you made. I would prefer that you take the 1300 Black Rock on plaintiff's exhibit.

A. It does not show all the workings.

Q. The Clark raise there as marked by Mr. Burch and Mr. Wiley?

A. The Clark raise, which we have generally spoken of as the Black Rock raise, is marked upon exhibit 22. The timbering

1541 has been removed from the back of the *still* floor, which is at the level, all the way across from the raise to the south side of the work, at the sill floor, as shown upon exhibit 22. Starting at

the north wall, which—where there is the customary zone of heavy fault gouge which has been followed down the Black Rock tunnel all the way to this level in a continuous raise. From that point the vision is absolutely uninterrupted to the south side of the working and there is disclosed a solid body of zinc ore, as solid and undisturbed as any body of ore that I have seen in any—in either of these two mines, having no transverse fissures in it which were recognizable. There is no difference, absolutely, in the character and structure of the ore; it is massive.

Q. For what distance; for about thirty feet?

A. About thirty-five feet. I might state in my response that the ore is a solid body, an unusually solid body; that it does not differ from the ore body at any other point in the mine in having little boulders and fragments of loose, altered, displaced granite.

Q. In places you mean?

A. In one particular place, here. Ordinarily there is more than that in such a disclosed ore vein. In one place, as mentioned by Mr. Burch on the south side of the particular set of timbers which have been opened, there is a little boulder of granite which is not entirely converted into zinc, which has been cracked up somewhat but this granite boulder is not in the form of a fissure and

1542 does not extend westerly across a set of timbers.

Q. In the roof, as you travel across southerly from the Clark shaft, were you able to observe anything to indicate that on that level one vein had been passing through another?

A. No, it is all one vein.

Q. How about the gouge after you leave the north side, which you have already referred to?

A. Further south, that is the only gouge disclosed along that exposure of the vein.

Q. At the Clark shaft?

A. Yes, the one on the north side.

Q. How far above your head is the top of the stope from the crosscut?

A. This is not really the stope; it is the sill floor.

Q. How far above you was that?

A. It was within reach of your hand.

Q. Have you since you were upon the stand last made any further examination with a view of determining where the north boundary line of the Elm Orlu Black Rock vein crosses the common side line of the two claims?

A. Yes.

Q. Has there been any work done there since you gave your testimony?

A. Yes, sir.

Q. Pull down the map you have reference to and point out that new work that has been done there?

1543 A. At the time I was asked about this before, referring to Exhibit 65, there was a drift driven which I marked upon the map "Drift on north wall," a short distance from the surface. Since that time the actual wall of the vein has been followed up to the actual surface, and having a southerly dip, it decreases the dis-

tance westerly along the south line, so that it is now determined to be at 190 feet from the southwest corner, at the apex, from the southwest corner of the Black Rock claim.

Q. I wish you would describe to the court briefly as well as you may the line of junction between the Black Rock vein and the northerly dipping branch of the Elm Orlu Black Rock?

A. I might state that there is a line of junction which begins at the surface, but that is east considerably of all of the region where the northerly dipping branch of the Elm Orlu vein passes downward into the ground.

Q. That would be easterly of where such junction has been formed?

A. Yes.

Q. Going to the levels below, starting at the east, give the uppermost level where you find the junction unmistakably exists?

A. There is a point of junction developed on the 1000 level of the Black Rock. This is a point of junction of the main Black Rock——

1544 Q. Maybe that would be clearer if you used the section than the plan map?

A. I think we might use both to advantage. This is a starting point toward the east of the junction between the actual main part of the Elm Orlu and the main Black Rock vein, but it is within the region, which, deeper down in the ground, is affected also by the northerly branch. Cross section 25 is the nearest cross section to it. It will be seen that the Black Rock vein and the Black Rock Elm Orlu vein——

Q. The northerly dipping branch?

A. No, this is the main branch. To take the northerly dipping branch, however, they are very nearly parallel on their dip, not on their strike; slightly east of the cross section 25, there is developed in the drift 1002 an actual junction of the two veins, which has been described, for easy reference, as a point located with reference to the southwest corner of the Black Rock claim as follows: 462 feet east and 58 feet south from the southwest corner of the Black Rock claim. I might explain further in connection with that point that that is a point developed in a working in which the junction is developed, and that although there are other parts of the Black Rock vein which might make a junction further west, they are not developed. This junction is a point that is positive.

Q. Proceed to the next one?

A. At the 1200 Black Rock there is a cross cut running slightly northwesterly and marked 1208 on the map, Exhibit 78. It

1545 runs to and beyond both veins to the north, in the region and slightly south of the station 405 upon the map. There is a definite junction of the two veins developed in this cross cut, although there is more vein matter westerly, and there is undoubtedly a junction of the two at a point further west—this is developed and known in the workings. That does not show on any of the sections; it lies between Section- 23 and 25, and corresponds

with the junction which would be developed down on the dip in this section.

Q. Proceed.

A. But upon this level the point which is developed by a definite working the distance is 320 feet east and 18 feet south from the southwest corner of the Black Rock.

Q. You mean you go that distance east and then that distance south from that point?

A. Yes, and it will be noticed that on the plan map there are green lines, which, at frequent intervals, show the north and south and east and west direction, which may be used as a guide.

A. Referring to defendant's exhibit 80 and exhibit 79—exhibit 80 being the level of the 1300 Black Rock, exhibit 79 showing the sixth floor up in the stope—there is between these two a certain definite development of the junction of the two veins which does not show precisely on either.

Q. Between the two?

1546 A. Yes. Section 23 exhibits the relation of junction—on section 23, exhibit 86, it will be seen that the two veins are joined into at the level.

Q. What level?

A. 1300 Black Rock. A short distance above the level—25 feet, the main part of the Black Rock and the main part of the northerly dipping branch of the Elm Orlu are seen to be united. This point is described therefor- with reference to the stope above the 1300 Black Rock, and described as follows, at a level plane 25 feet above Blac. Rock 1300 in the Black Rock raise. Therefore almost precisely, if not precisely, upon section 23—located 204 feet east and 59 feet north.

Q. And thence 59 feet?

A. Yes, and thence 59 feet north of the southwest corner of the Black Rock.

Q. Let's see it on your plan map?

A. It lies just below exhibit 79, where these two veins are converging in their dip, and just above eighty, where they have already converged and are united, and are joined, midway between these two elevations upon the cross section, the floor of the level being shown upon exhibit 86 here and the sixth floor being shown upon the upper—two plan maps at this point. So the junction is midway between the two plan maps and is actually shown in the working and observable at the present time. Thence the junction continues along this level plane.

Q. The horizontal plane?

1547 A. Yes.

Q. In what direction?

A. In a westerly direction, to the west end line of the Black Rock. The two veins are found still to be united and joined into one.

Q. Have you anything to say about the Creden vein in that connection, the branch called the Creden vein?

A. There are two workings which show definitely the junction of the Creden branch and the Black Rock vein and the north dipping branch of the Elm Orlu vein, spoken of as the Rainbow lode of the plaintiff. On the 1200 foot level of the Elm Orlu, in the working marked 1227——

Q. Upon what exhibit?

A. Upon exhibit 75—the Creden vein is shown joined with the Elm Orlu vein—the north dipping branch of the Elm Orlu vein.

Q. Show that on cross section 21?

A. There is a cross section 22 newly prepared which shows that almost precisely. Would you like to have that now?

Q. Is that a new one?

A. Yes.

Q. The one I called upon you Friday to have prepared?

A. Yes, sir.

Q. Yes, produce that if it will aid you in your description?

1548 (Witness produces the cross section.)

Mr. Dickson: We would like to have this marked and offered in evidence.

Whereupon the cross section was admitted in evidence and marked Defendant's Exhibit 116.

Q. I will ask you, Mr. Finch, if that exhibit is a section taken through the Bruce raise?

A. Yes.

Q. Where?

A. Almost exactly at the north end of the Bruce raise.

Q. And what, if any, projection has there been to that plane of section?

A. There has been practically none.

Q. Go on and describe it, and then go on with what you have to say about the Creden vein?

A. Exhibit 79 shows best the nature and position of the Bruce raise because it shows the raise coming up from the 1500 foot level of the Elm Orlu to the 1400 Elm Orlu and the beginning of it as it passes upward to the 1200 Black Rock. It will be observed that the end of it is just two or three feet from the plane of section 22, which, in the time we had at our disposal was the easiest one to construct, and it happens to be almost precisely in the raise.

Q. Proceed with the description of that section?

A. The cross section also, and very nearly the point which I have described as the junction point of the Creden vein with the
1549 north dipping branch of the Elm Orlu vein, there is at the region of junction of the Creden vein and the Elm Orlu vein not only the Creden vein but a large vein mineralized from it spreading out and turning in such way that the Creden vein is still joined with the Elm Orlu vein along the lower vein, the 1213 crosscut shown on exhibit 16.

Q. And where, if at all, would that Creden vein on that plane of section unite above with the Black Rock vein?

A. It united just above the 1000 foot level of the Em Orlu and the junction in another plane of section has been developed by a working which carries the two veins together from this level.

Q. Anything further you have to say with respect to this Creden vein?

A. There is another point where it is found joined with the north dipping branch of the Elm Orlu?

Q. Where is that?

A. On the 1300 foot level of the Elm Orlu in the working 1312 upon defendant's exhibit 77. The point has been described in the midst of an ore body which is formed at the junction of the Creden vein and the north dipping branch of the Elm Orlu. That point is described as follows: 20 feet due west of the southwest corner of the Black Rock.

Q. Due west of what?

A. The southwest corner of the Black Rock claim.

Q. Let's see cross section 7 of the plaintiff.

1550 A. The junction of the Creden vein is illustrated by section 21.

Q. On the block model?

A. Yes, on the block model at two of the points described, namely its junction upward with the main Black Rock vein and its junction downward with the north dipping part of the Elm Orlu vein.

Q. I wish to call your attention for a moment to certain observations that you have made on the 300 foot level of the Black Rock near the east end of that claim, shown on Defendant's model 101, to which I now point. There is a cross cut at the extreme easterly workings shown on the model, and I call your attention to the point next west thereof. Do you know the point I refer to?

A. I do.

Q. Describe the result of your observations there?

A. Plaintiff's Exhibit 10 corresponds, at least approximately, with the map with which I worked underground. I found passing into the west end of that drift, which extends somewhat further than shown upon the map, the southerly wall of a large vein which is followed along that drift for a distance——

Q. How large a vein?

A. Oh, I have mapped it, the solid massive part of it 20 feet in width.

Q. Proceed.

A. That is where it shows in the cross cut, not in the drift.

1551 Passing easterly along the drift, the drift is found to follow this south wall to a point about 10 feet west of the cross cut referred to. It leaves the drift on the south side at that point.

Q. West or east?

A. It leaves the drift passing westward at that point, and from that point it has an east and west direction. In the cross cut— where the drift passes out from it toward the east, the drift is closed

and filled up, but the wall of the vein is considerably south of the south side of the drift going toward the west, which is the only drift you can get into. Upon my notes I have mapped the strike of the vein as it is last seen in its direction eastward, as due east and west; that is, the south wall of the vein. It has a dip approximately vertical on this wall.

Q. On Exhibit 66 I call your attention to a northwesterly piece of work running out from station 1119, about which you testified when you were on the stand before. I will ask you in connection with your cross examination on that when you were on the stand before, if you have examined the Niagara tunnel for a distance northeasterly and southwesterly from where this so called fault is shown running from station 1119, along the course of the Niagara tunnel, with a view of determining whether there was any dislocation of the vein in the Niagara tunnel?

A. The Niagara tunnel does not extend far enough east, but the drift described as the 300 foot level does.

Q. All right, take that up?

1552 A. As shown upon Plaintiff's Exhibit No. 10 there is a long drift, about 300 feet long, extending out to a point about 200 feet from the east end line of the Black Rock claim; in other words, to a point some 70 or 80 east of what has been referred to as a fault. The drift extends a much longer distance west of the position referred to as the position of the fault.

Q. You mean what drift?

A. The drift shown on Exhibit 10, the northerly drift on which there is considerably red representing vein approximately as I observed it under ground.

Q. Did you examine that drift from end to end?

A. I did.

Q. State what, if any, evidence there is of faulting through that drift?

A. There is none. The drift follows on quartz to the south wall of the quartz body, and there is no dislocation of the quartz body by any fault running northwesterly. There is fault gouge along this north wall approximately, running with it, in its own direction.

Cross-examination.

By Mr. Gray:

Q. May I see your notes on that; how far south did you fix that south wall from the south side of the drift, Mr. Finch, on Exhibit 10, this drift we have been speaking of; we will call it the W. H. W. drift.

A. About two feet from the south edge of the drift, around behind the post.

1553 Q. Where was it that you got that course of east and west; around behind the post there?

A. By mapping it at the point where it leaves and the point where

it crosses that cross cut, and the direction of the wall as it leaves the drift is east and west, and the wall as it plats on the map is east and west.

Q. Upon your own map of the south wall has it changed course from the point where you first mapped it toward the other end, that is, the course that you have; not the local course, but the general course—what is that?

A. In the west end of the drift?

Q. No, from end to end where you have observed it at its two extremities, give me that course?

A. From end to end it changes from north 75 east to due east and west.

Q. What is the course as shown throughout the working you have observed?

A. You mean the average?

Q. Yes.

A. About north 82 east.

Q. And in the other north working, what course?

A. It is only shown in one cross cut for a distance of about five feet, and its strike is north 75 east.

Q. What dip did you get for that vein; did you observe the dip of it?

A. The dip was to the south. I have marked it 85 degrees.
1334 That means in my notes that it is just barely perceptible south dip. On the other side it dips more strongly to the south.

Q. What is the dip on the other side?

A. 76 to the south.

Q. Have you examined the stope east of the cross cut; there is a stope east of the cross cut?

A. There is a caved stope at the surface.

Q. Have you examined that?

A. Yes, as far as it could be done, and as far as it has been opened up in the Mill tunnel.

Q. Is that the same vein that is shown in that drift and cross cut?

A. I don't think there is any doubt of it whatever.

Q. Isn't there a small stope opened up, east of the cross cut in this drift, above the initials W. H. W.?

A. I think there is a stope there, yes.

Q. Did you examine that?

A. That was filled up when I was in there.

Q. When were you there?

A. Sometime ago.

Q. You have no notes of that stope?

A. It is my recollection that you can't get into that more than three or four feet; possibly one set.

Q. You have no notes of it?

A. No.

Q. Where did you fix that point that you call a junction on the 1200 foot level, Mr. Finch; just point that point out to me?
1335 A. In a little cross cut, No. 1200-A, in the midst of a mass of ore. It is not the mathematical point, of course.

Q. How far is it from this blue gouge that you see on the map?
A. Oh, it is in the ore; it is not along the gouge.
Q. There is an evident junction there of these veins having distinct courses and dips?
A. They have distinct courses and dips until they join, and then they have the same course and dip.
Q. Just about at the point of junction and just westerly from there the different courses of the bands in the two veins can be observed, can they?
A. The different courses of the walls of the two veins themselves, and to a certain extent of the ore structure.
—. ——.
A. The definite course of the wall of the two veins has a certain extent of the ore structure.
Q. The ore structure in each vein could be observed to the west of this point which you refer to?
A. It could be when the workings where first opened.
Q. You spoke of section 7. Does that represent the junction——

Mr. Dickson: I asked that it be produced so I could see it. I didn't ask him any questions about it, but you may proceed.

Mr. Gray: *It* that the junction on exhibit 32, the junction upwards that you referred to?
1556 A. It is not exactly the same line of section but nearly so, as section 21.
Q. And that represents what you regard as the junction of that vein, what you call the Creden vein with the Jersey Blue or as we call it the Black Rock?
A. Yes, the workings below the 1200 Elm Orlu show them joined.
Q. And you think in that section they are joined as shown?
A. Yes. The point where the red line of the Creden vein passes downward in the 1300 Elm Orlu is almost precisely the point described as the point of junction.
Q. And you think that there is also a junction upward with the Jersey Blue, of the Creden?
A. Yes, it is developed in this section.
Q. Developed in section 7, exhibit 32?
A. Yes, it is the only line of section on which it is developed upward to the junction.
Q. On the 800 Elm Orlu, exhibit 13, will you indicate the point of junction there on the strike of these two veins?
A. That of course is a junction upon strike of the main Black Rock-Elm Orlu vein and of the Black Rock vein, not of the north dipping branch.
Q. Go to the point where you have observed it or where it is developed there?
A. It is not a junction, of course, at a point. There is a great deal of the Black Rock vein that leaves this 808 and joins in undeveloped territory, but I should say in crosscut 817 at a

1557 point as I now indicate with a heavy black mark, measured from the middle of drift 808, about 25 feet south of the drift 808.

Mr. Gray: That is all.

Witness excused.

Testimony of Professor Irving, Recalled, for Defendant.

Professor Irving, recalled on behalf of the defendant, testified as follows:

Direct examination.

By Mr. Dickson:

Q. In examining the record or transcript of the testimony yesterday I am unable to ascertain where your section 9 was placed. I wish you would fix that with precision?

A. You wish that fixed on this map or your map?

Q. No, your map, any map.

A. I will find that correctly (indicating).

Q. How is it designated now upon plaintiff's exhibit 13?

A. That is one of these two sections that I spoke of as not being exactly on the co-ordinate lines.

Q. Will you tell me precisely how far that is from the Black Rock or Clark raise and in what direction therefrom?

A. I am not quite certain that I know exactly what you mean by the Clark raise; is that the wet raise?

Q. Yes, it has been so designated; it is shown here upon the model?

1558 A. It is different in its position on the different levels because the raise is offset.

Q. From that part of the Black Rock raise extending from the 1300 Black Rock to what is shown on the model exhibit 108 in figures 1238 and thence on up to where you have the first set off of the raise; that would be from what point, 1221 crosscut goes through that?

A. That which I have my finger on is 1221. Now, you want the distance of the section from that portion of the raise downward?

Q. From there to the bottom, yes. The map on which you have fixed the section line is plaintiff's exhibit 13?

A. Yes.

Q. Now, proceed.

A. Taking the 1200 Elm Orlu, that raise that is marked on the model is evidently not indicated on this map. This is the other portion of the raise coming downward and it must be somewhere in here. I can't locate that exactly on this map.

Q. Well, it is within a few feet—does the section line pass within a few feet from the Black Rock raise?

A. I think I can get that pretty accurately from the model.

Q. I want it from the westerly end of the Black Rock claim to the westerly edge of the raise. Professor, does the section line pass to the east or west of the Black Rock raise?

1559 A. Of that continuation of the Black Rock raise which goes downward from the 1200 Elm Orlu, the section line is to the east of that. I cannot be absolutely sure just how far that is, because measurements on this model will not be exact.

Q. Well, you can give a close approximation it is to where the line would pass?

A. From the center of that portion which goes downward from the 1200 Elm Orlu in an easterly direction it is about 40 feet as things are indicated on the map. From the easterly edge of the raise I could not tell you, because I would have to plat that very carefully on the map to be sure.

Q. Well, I would like to have you do that! I do not ask you to do it now, but so you can give it to me before the case closes?

A. Yes, sir.

Cross-examination.

By Mr. Gray:

Q. At the time the maps were presented, Professor, did you know of such a raise as the one which you have just been questioned concerning, which is on the 1300 and up to the 1100 of the Black Rock?

A. I did not.

Q. Had you ever been through it?

A. I had not.

Q. Did you ever hear of it or know of it prior to the time

1560 the model maker put it on the model here one morning just before court time?

A. Not to my recollection, no.

Witness excused.

Testimony of Walter H. Wiley, Recalled, for Defendant.

WALTER H. WILEY, recalled for further cross-examination, testified as follows:

Cross-examination.

By Mr. Gray:

Q. Will you get your notes of the Black Rock 300, Mr. Wiley. Were you in that stope just easterly of the drift to which you have given your initials, W. H. W.?

A. That is marked filled. I have been in there and as much in there as I could get, but I have a notation "Filled" on that drift, that is, for the eastern portion of the drift from the cross cut.

Q. You were able to get in there and get the course of the vein in that stope, weren't you?

A. In that portion running westerly from the cross cut—that is, this portion is accessible and extends to the south further than is shown upon this exhibit; but this portion to the north is filled, and this cross cut to the south is filled and were filled at the time I was there.

Q. Wasn't there a raise there that leads up into a stope, and you can follow up for 50 feet?

1561 A. I don't recall such.

Q. Have you any note of it?

A. No, but I do remember and my notes show that the portions east and south were filled.

Q. You did not go up that raise; have you got it marked on your note book at all?

A. I have not.

Q. Then you have given all of the information concerning the workings in and about the W. H. W. cross cut and drift that you have?

A. I have the further notation going south of "Caved" and that is all.

Witness excused.

Testimony of Henry D. Morse for Defendant.

HENRY D. MORSE, called as a witness on behalf of the defendant, being duly sworn, testified as follows:

Direct examination.

By Mr. Dickson:

Q. State your name?
A. Henry D. Morse.
Q. Your age?
A. 33.
Q. What is your business?
A. Mining engineer and surveyor.

1562 Mr. Dickson: We do not put this gentleman on as an expert, of course.

Q. Are you in the employ of the Butte & Superior Company?
A. I am.
Q. In what capacity?
A. As engineer and surveyor.
Q. Are you at the head of the surveying department of the company?
A. Yes, sir.
Q. How long have you occupied that position?
A. About seven years.
Q. I will ask you whether in the discharge of your duties as

surveyor, when the sill floor of a stope is opened, whether you make notes of it as the work progresses?

A. Yes, sir; ever since I have been in the employ of the company it has been part of the duties to take notes of the progress.

Q. How were your notes recorded, on a plat, with observations explanatory of them or what?

A. In a small sealed note book, making notations of the walls and the character of the ore.

Q. What do your notations cover on the sill floor; what do you note as the work progresses on the sill floor of the stope as to ore, gouge, seams, slips and things of that kind?

A. Well, I noted all those things, the walls and the dips and strikes.

1563 Q. How is gouge indicated on your notes?

A. Very often I just drew a pencil line, very often in red, to indicate the gouge, and the ore was indicated in blue. That was the first color scheme that we used.

Q. The ore would be indicated in blue and the gouge in red?

A. The gouge in red, and the ore in blue, yes.

Q. Have you on your notes red dots or crosses to indicate anything else than gouge?

A. I often used slight crosses for quartz and little red dots for manganese. At first I kept the manganese indicated separate from the vein material or zinc ore.

Q. Have you with you your original notes of the 1300 of the Black Rock level, the westerly portion of it?

A. I have, yes, sir.

Q. What is this book that you now hold in your hand?

A. This is the one in which I took the notes I refer to.

Q. Original notes?

A. Original notes in the mine as the work progressed.

Q. What is the scale of the platting shown upon the book that you now hold before you?

A. It is very nearly 20 feet to the inch. I made the square sets to corresponds with the ruling of the paper.

1564 Mr. Dickson: I now ask to have these two pages marked for identification.

Mr. Gray: Well, I am going to object to the testimony of this gentleman concerning matters of opinion and geological opinion. We understand the rules of the court to be that there are only five experts on a side, and I think perhaps all ten have testified concerning this territory, or will have by the time the case is closed. This is just an attempt to bolster their case up by the testimony of this kind.

(Two pages of Mr. Morse's notebook marked for identification Defendant's Exhibits 117 and 118.)

Q. Will you point out on Defendant's Exhibit 80 what portion of the 1300 foot level as shown upon that exhibit is covered by these notes?

Mr. Gray: I object to that. The preliminary examination is sufficient to show that this is just an attempt to have another geologist testify.

Mr. Dickson: I think my friend is a little premature with the objection. These are preliminary questions.

The Court: Yes; let us get through with the preliminaries and then we will see.

Q. Indicate upon this exhibit what portion of that level is covered by your original notes which have been marked for identification Exhibits 117 and 118?

A. The portion lying to the west of co-ordinate line 24 plus 50, where it is shown as a raise going up from the 1400 of the
1565 Black Rock; from that point to the west end of 1304 drift is covered in the notes.

Q. Was that work done and all these notes made before this lawsuit was commenced?

A. Yes, sir; about a year before.

Q. Now, I will ask you, Mr. Morse—don't answer this question until an objection can be made—to point out what you had noted there about ore and what about gouge and what about manganese or quartz?

Mr. Gray: I object to that as calling for expert testimony; just the introduction of another geologist.

Mr. Dickson: I will state why we offer it so his honor can rule upon it intelligently. We offer to show by the original record kept by the surveyor in chief of the defendant company, a record of the company along some years—I understand it at least considerable time anterior to the commencement of this suit—and to show by these notes that in this portion that the witness has referred to on the 1300 foot level just what gouge is shown, what its course is, just what slips were shown and what their course was and where there is solid ore and where there is manganese and quartz encountered, for the purpose of combatting the contention of the plaintiff that on that level the Jersey Blue vein is found coursing diagonally across the Rainbow lode as shown upon their exhibit 22.

The Court: Well, is this excavated material, no longer there, material not now observable?

The Witness: A great deal of it.

1566 Mr. Dickson: Generally speaking I understand it has been removed in places to stope.

Mr. Gray: It is the place concerning which all of this testimony was given this morning, where they say they have only taken out one floor and you can see clear across on the top, where you can go up into the stopes on the second and third floor and see the vein clear across. Mr. Burch, Mr. Wiley both testified to it and Mr. Finch testified to it.

Mr. Kremer: If your honor will permit me I would suggest that the purpose is not to ask any geological interpretation of the witness, but merely as to what he found, the physical fact. It does not take a geologist to testify that there was ore or gouge or a slip—merely as

to the existence of certain conditions at a certain time. No deduction is asked from the witness and he is asked to explain nothing or give any opinion as to what it is or its relation to anything else in this testimony.

The Court: But you have got his opinion right there in writing, if he reads his notes it is an opinion.

Mr. Kremer: If he submitted his notes that might be true, but as to what he found that is not, your honor.

Mr. Gray: Isn't that what all experts testify to?

Mr. Kremer: I haven't found it to be so.

The Court: Well, we will let it go in and if it is a matter of expert testimony it will not be regarded; but it seems to me it may
1567 be on the border line of fact. I think that either of you would be privileged to call practical men, practical miners, to tell you what they saw in certain places, and especially if it is material that has been excavated. I think it is proper perhaps and it should go in. At any rate it will go in under the usual rule throughout the case. The objection will be overruled and exception may be taken and if it is not entitled to consideration, becomes strictly under the rule of expert testimony, the court will disregard it.

Mr. Dickson: Can you tell about when that work was done as covered by your notes?

A. The latter part of 1911 and the first part of 1912.

Q. Referring to exhibit 117 first marked for identification, I wish you would stand so the court can see what you are pointing to—what does the blue on this exhibit 117 represent?

A. The blue represents ore, zinc ore.

Q. What do the small red marks on that represent?

A. The small red dots are manganese.

Q. And quartz I think you said?

A. And quartz. This is quartz.

Q. On exhibit 117, that is the left hand page—is there any gouge noted?

A. I have noted gouges here and fault walls.

Q. Here is where?

A. On the north wall. Another notation of the fault wall
1568 on the north, nearly vertical, irregular fault wall at the west end, on the north side.

Q. Now, taking exhibit 118, the right hand page, what does the blue represent, to which I now refer?

A. The same.

Q. Ore?

A. Ore.

Q. And the small red marks manganese and quartz?

A. Manganese and quartz.

Q. What gouges have you represented on that?

A. Besides about three notations of gouges along the north wall and two gouges running in ore near the raise, coming from the 1400 foot Black Rock——

Q. Are they correctly platted there?

A. Correctly platted, according to the way cut through the timbering.

Q. That is the course is correctly platted?

A. Yes.

Q. Turn to your 1400 foot level.

(Witness indicates.)

Mr. Dickson: We would like to have this marked for identification.

The page marked Defendant's Exhibit 119 for identification.

Mr. Dickson: Pull down the 1400 foot level please. When was the plotting on the sill floor of the 1400 foot level done so far as the same is represented on your notes marked defendant's exhibit 119?

A. In 1911 and 1912.

1569 Q. What portion of the ground or of the Black Rock vein shown on defendant's exhibit 82 is covered by your notes, exhibit 119?

A. The portion here to the west of crosscut 1408 and 1410, to the south.

Q. West of 1408?

A. West of 1408.

Q. Have you any gouge noted on that 1400 foot level, that portion of it?

A. I have noted in two or three places gouge on the north wall and no further gouges on the sill floor.

Mr. Dickson: We offer this in evidence in connection with the testimony of the witness.

Mr. Gray: The same objection.

The Court: The same ruling.

Whereupon the exhibit was admitted in evidence and marked Defendant's Exhibits 119, 118 and 117.

Mr. Dickson: On what level or levels, if there be more than one, had the extraction of the ore by the Butte Superior Company extended beyond the southerly side line of the Black Rock claim, and passing the end line planes of that claim projected southerly in their own direction at the time this suit was commenced or up to the present time; more than one level?

A. I only know of one where they have been under that territory that you mention.

Q. Under the Elm Orlu ground?

A. Yes, on the Black Rock claim.

1570 Q. On the 1300 foot level?

A. 1300 of the Elm Orlu. I am not sure that there is any stoping done there.

Q. Some ore extracted?

A. Yes.

Q. Can you point to it on this exhibit 77 where the workings of the Black Rock extend southerly of the north side line of the Elm Orlu and how far?

A. Workings of the Black Rock?

Q. Workings of the Black Rock, in the extraction of ore?
A. Done by the Black Rock people?
Q. Yes.
A. In our 1200.
Q. That would be practically the same as the 1300 Elm Orlu?
A. Just under it.
Q. Whereabouts and to what extent?
A. We took out the sill floor here on this plan and the three floors, much smaller than the area shown on the sill.
Q. Well, about how far southerly did the work go from the northerly side line of the Elm Orlu?
A. Practically one hundred feet.
Q. And how far easterly and westerly approximately?
A. About 100 feet.
Q. And three floors high?
A. About three floors high. That is the north side of the
1571 Elm Orlu; also the south side line of the Black Rock.
Q. Yes, and that is all as I understand it?
A. Yes.

Cross-examination.

By Mr. Gray:

Q. What is the course of the gouge which you show in 1416 crosscut as you have it in your exhibit over here?
A. That is the end of the 1410.
Q. What is the course of that gouge in the 1410 as you have it?
A. I didn't give that a course and this is not oriented; you can't take the course of this book. That is oriented with the timbers, running with the book and not north and south.
Q. Do the best you can to orient it and give me the course of the gouge as you have represented it in 1410 crosscut. With a protractor and these maps you will be able to work that out?
A. It is close to the same they have it; a little off of a right angle to the 1410 crosscut. I would judge a course of north 70 west.
Q. What does the green represent?
A. Granite.
Q. What is this sketch up here on the northeast corner of your book?
A. That is the 1300, a little working to the east of this
1572 working shown here, to the east of this raise before mentioned.
Q. I note on this 21 it says "continued from page 23." Would you object to showing me page 23?
A. No (indicating). These are old notes; this is recent work. I have not been able to get into the 1406.
Q. The notes that you show, what probably is indicated as the hanging wall here on exhibit 118 with a northerly dip, what is the dip given there?
A. About 75 to the north.
Q. That is the north wall?
A. North wall as shown there.

Q. The hanging wall?
A. Yes.
Q. And how about this south wall; what is its dip?
A. I haven't the south wall shown on that.
Q. Isn't it developed on there?
A. No.
Q. What did you say was the dip of this; how much?
A. The southernmost one is 78° north and the northern one is 85° to the south.
Q. And the northernmost one has what course?
A. Slight north—that would be north 75 west.
Q. Didn't they continue on, those gouges?
A. Not when I took my next observation; might have been a few sets ahead; they were not to be seen.
Q. And they cannot be found?
A. Cannot be found.
1573 Q. Have you been in the stopes above?
A. Not here; I never took any notes on the stope.
Q. Haven't looked at them up there?
A. No.
The Court: Where was it that you took the notes of this?
A. On the sill floor, as the sill progressed.
The Court: That is there today?
A. That part right there is stoped out two floors—you just mentioned if I was up on the second floor.
Mr. Gray: But the main sill floor is there today, where you took these notes—is that floor stoped out?
A. Not that sill; it is stoped out but you can get through the sill floor now.
Q. And the floor that you show here is still there?
A. That is still there except the filling that has been done since.

Witness excused.

Mr. Kremer: I desire to offer in evidence the original deed from the Clark-Montana Realty Company to Amasa P. Peake, the predecessor in interest of the Butte Superior Company, Limited, conveying the property therein described.
Mr. Folsom: We desire to offer an objection to the admission of the deed on the ground that it does not purport to convey nor does it convey anything except the Black Rock claim.
The Court: The objection will be overruled.
Mr. Folsom: Exception.

1574 The deed admitted in evidence and marked Defendant's Exhibit 120, a true and correct copy of which is as follows:

"This indenture, made and entered into this 29th day of October, 1906. by and between the Clark-Montana Realty Company, a corporation, created, organized and existing under and by virtue of the laws of the State of Washington, and doing business in the State of

Montana, party of the first part, and Amasa P. Peake, of Valley City, North Dakota, party of the second part.

"Witnesseth: That the said party of the first part, for and in consideration of the sum of One ($1.00) Dollar, lawful money of the United States of America, to it in hand paid, the receipt whereof is hereby acknowledged, does remise, release and forever quit-claim unto the said party of the second part, and to his successors forever, all the right, title, interest, claim and demand of the party of the first part in and to that certain portion, claim and mining right, title and property on those certain ledges, veins, lodes or deposits of quartz and other rock in place, containing precious metals of gold, silver and other metals, and situated in Silver Bow County, state of Montana, the following described mining property, to-wit:

"An undivided one-fourth (1-4) interest in and to that certain quartz lode mining claim, known as the 'Black Rock' quartz lode mining claim, designated as Lot No. 53, Mineral Survey No. 596, in Township 3, N. R. 7 W., embracing a portion of section 6,
1575 in township 3, N. R. 7 W.

"It being the intention of the party of the first part to convey to the party of the second part all of its right, title and interest in and to the above described property.

"Together with all the dips, spurs and angles, and also all the metals, ores, gold, silver and metal bearing quartz, rock and earth therein, and all the rights, privileges and franchises thereunto incident, appendant and appurtenant, or therewith usually had and enjoyed; and also all the estate, right, title, interest, possession, claim and demand whatsoever of the said party of the first part, of, in or to the said premises, and every part and parcel thereof.

"To have and to hold, all and singular, the said premises, together with the appurtenances and privileges, unto the said party of the second part, his heirs and assigns forever.

"In witness whereof, the party of the first part has caused its name to be subscribed, and this deed to be executed by A. H. Wethy, Vice President of the party of the first part, and W. M. Bickford, Secretary of the said party of the first part, they being duly authorized to act herein by the Board of Directors of the said party of the first part.

CLARK-MONTANA REALTY COMPANY,
By A. H. WETHEY,
Vice President.

Attest:

[CORPORATE SEAL.]

W. M. BICKFORD, *Secretary.*

1576 STATE OF MONTANA,
County of Silver Bow, ss:

On this 29th day of October, 1906, before me, W. C. Siderfin, a Notary Public, in and for Silver Bow County, State of Montana,

personally appeared A. H. Wethey, known to me to be the Vice President of the Clerk-Montana Realty Company, a corporation, created, organized and existing under and by virtue of the laws of the State of Washington, and doing business in the county of Silver Bow, state of Montana, and W. M. Bickford, known to *be* to be the Secretary of the Clark-Montana Realty Company, a corporation, created, organized and existing under and by virtue of the laws of the State of Washington, and doing business in the county of Silver Bow, state of Montana, whose names are subscribed to the foregoing instrument, and acknowledged to me that they upon benalf of the said Clark-Montana Realty Company executed the above and foregoing instrument.

In witness whereof, I have hereunto set my hand and affixed my Notarial seal on the day and year in this certificate first above written.

[NOTARIAL SEAL.] WM. C. SIDERFIN,
Notary Public in and for Silver Bow County, State of Montana.

1577 Filed on back:

STATE OF MONTANA,
County of Silver Bow, ss:

"I hereby certify that the within instrument was filed for record in my office on the 1st day of March, A. D. 1907, at 3 min. past 12 o'clock P. M. and recorded on page 73, of book 81 of deed records of Silver Bow county, Montana. Attest my hand.

GEO. H. SCOTT, *County Recorder,*
By R. P. BERYCUCIRE, *Deputy.*"

Mr. Kremer: I also desire to offer in evidence a letter dated June 4th, 1915, from J. L. Bruce, manager of the Butte Superior to W. D. Mangam, Manager of the Elm Orlu. This merely supplements the correspondence heretofore introduced, and I have submitted it to counsel.

The Court: Was this other correspondence introduced?

Mr. Kremer: Yes.

The Court: Very well.

The letter admitted in evidence and marked Defendant's Exhibit 121, a true and correct copy of which is as follows:

"June 14th, 1915.

Mr. W. D. Mangam, Manager, Elm Orlu Mining Company, Butte, Montana.

DEAR SIR: Referring to your favor of the 11th inst., we beg to advise that we expect to be able to complete all of the work outlined therein by September first, with the following exceptions or qualifications:

1578 Clark Tunnel.

1. In order to complete 300 feet of drifting from the face of the drift near transit station 1001 it will be necessary to operate three shifts. This is practicable.

2. The drift requested northwesterly from a point 40 feet south of station 910 in the Clark Tunnel cuts directly under our big hoist and one of our compressors and the roof of this drift is only 25 feet below our hoist foundations which has already begun to settle and give us trouble. In view of the fact that we cannot safely drive this drift for more than a few feet, we request your further advices in the matter.

700 Foot Level.

As there is approximately 235 feet to raise from our 700 foot level to our 450 foot level, and as the air will prevent our working three shifts, it is improbable that we can complete this much before the end of September.

600 Foot Level.

As it will be necessary to transfer all waste from the raise above our 700 foot level through raises to the 900 foot level, and to put this waste together with all the waste taken off the 800 foot level into a single stope just below our 900 foot level, it will probably be impossible for us to drive the 804 drift westerly at a greater rate than about 80 feet per month. At this rate we can drive about 280 feet by October 1st. If you wish to secure faster progress than this, I would advise that you raise from your 1000 foot level and
1579 drift easterly to meet the heading which we will be driving from our 800 foot level. We can complete the entire 500 feet if given sufficient time to do so, but this would require at least five months. Please advise your wishes in this matter.

1100 Foot Level.

We expect to be able to complete the work outlined on the 1100 foot level by September first or thereabouts.

Very truly yours,
(Signed) J. L. BRUCE, *Manager.*"

Mr. Kremer: It may be agreed that at the time of the execution of this deed that the market value of stock of the Butte Superior Company, although the par value was five dollars a share, was four dollars a share.

Mr. Folsom: We will agree to the fact, but we object on the ground that it is immaterial.

Mr. Kenney: You are not waiving anything as to its materiality or competency, but the fact that it was that?

Mr. Folsom: Yes.

1760 *Testimony of George M. Bennett for Defendant.*

GEORGE M. BENNETT, called as a witness on behalf of the defendant, being first duly sworn, testified as follows:

Direct examination.

By Mr. Kenney:

Q. State your name?

A. George M. Bennett.

Q. What is your business or profession, Mr. Bennett?

A. I am an engineer.

Q. Where are you employed?

A. Butte & Superior.

Q. In what capacity have you been employed there and for how long?

A. As a mining surveyor for about three years.

Q. In the fulfillment of your duties as mining surveyor I will ask you to state whether or not you took samples from the points indicated upon the map or below the point which I now submit to you?

A. I did.

Q. What did you do with those samples?

A. I delivered those samples to the assay office of the Butte-Superior mine.

Q. Who is in charge of the assay office?

A. Mr. Marsden.

Q. Did you number each of the samples?

A. I did.

1761 Q. Thereafter did you receive anything from the assay office?

A. I received the assay returns from the assay office.

Q. Did those assay returns compare with the numbers upon the samples submitted by you to the assay office?

A. They did.

Q. What did you do in connection with this map after you received the returns from the assay office?

A. Why, I plotted the returns as received from the assay office upon this map.

Q. In plotting the returns upon the map, what have you to say with reference to the correctness of the figures indicated upon the map for the returns with reference to the place where you took each individual sample?

A. Why the distances of the sampling were taken with reference to certain cross cuts, drifts, raises, or survey points, and were plotted upon this map from those distances.

Q. Did you place the result of the return opposite the exact point from which you took the sample?

A. Yes, they would be approximately correct on this map, within half a foot.

Q. The number of each sample is platted upon here too?

A. Yes.

Q. And the result?

1582 A. The silver value in ounces and the zinc values in percentage, with the number following.

Mr. Kremer: I offer this blue print in evidence, to save having it numbered for identification first.

Mr. Gray: I would like to ask a question or two.

Mr. Kremer: Certainly.

Cross-examination.

By Mr. Gray:

Q. Referring to Exhibit 66——

Mr. Dickson: Will you insist on our calling the assayer, Mr. Gray?

Mr. Gray: No, you need not call the assayer. I suppose that the assays are correct.

Mr. Kremer: Then it may be admitted that the assays are correct?

By Mr. Gray: Did you take these samples at regular intervals in this working known as the Mill tunnel and the Mill tunnel cross cut?

A. They are not taken at regular intervals the full length of that tunnel.

Q. How many did you take in the Mill tunnel cross cut south of this drift from station 1093 to 1119?

A. I took several, some of which are marked on this map.

Q. I see you put one on the map?

A. Well, there are more than that.

Q. All right. In the cross cut from this station 1093 southerly——

1583 A. There is just one south of that point, yes.

Q. Can you fix the exact point on Exhibit 66 where you took that?

A. I can make the distance on that map. I have marked the point.

Q. Put a circle around that and put your initials there?

A. Yes, sir.

Q. You have put the initials G. B. on the Exhibit?

A. Yes, sir.

Q. That is the little northwest winkets on Exhibit 66 which you sampled there, isn't it?

A. I didn't——

Q. Just answer the question?

A. I did not take any notes with reference to the direction of the vein.

Q. Well, it is where that southerly veinlet having a northwest course is shown in that cross cut on Exhibit 66?

A. As shown on the map, yes, sir.

Q. Well, how did you happen to light on that place as a place to take a sample; did somebody tell you to take it there?

A. They did not; there is vein there and I sampled it.

Q. Was that the only vein you found in there?

A. No.

1584 Q. Why didn't you take some samples of the others?

A. I did.

Mr. Dickson: I will state to shorten the matter that I suppose this was done at my request. I requested to have them take samples there, to take the best material.

Q. Then you did have some directions as to where you should take it?

A. I did not.

Q. From no one?

A. No.

Mr. Dickson: I did not ask him; I gave the direction to Mr. Bruce.

Q. Did Mr. Bruce direct you to take this one?

A. No.

Q. You had no directions at all about it; these directions of Judge Dickson's never got to you?

A. You mean in taking the samples?

Q. Yes, or in platting them?

A. Well, I took other samples which are not platted on that map. I had no directions given me as to taking samples in any certain veins.

Q. Now, this sample is No. L-33 that we have been speaking of, is that it?

A. L-33, yes.

Q. And that is what is represented there—read that?

A. That is the width of the sample, one-half of a foot. Do you wish me to read the rest?

1585 Q. Show me how you get half a foot out of that?

A. Five tenths of a foot. One and one-tenth ounces of silver and no zinc.

Q. Why didn't you plat on here the other samples along this drift marked 4?

A. That was not considered as showing what this was introduced for.

Q. This working here was not considered as showing what you wanted to show, is that it?

A. No, not as showing what these samples were introduced to show.

(Exhibit No. 122 admitted in evidence without objection.)

Q. Won't you please produce your assays that you have in the Mill tunnel and the cross cut south of the station I refer to?
A. Do you wish the tracing?
Q. Let me see your tracing and we will look it over.

(Recess.)

By Mr. Kremer:

—. Mr. Bennett, you also made this map that I present to you, showing certain assays?
A. I did.
Q. By way of explanation the first figure appearing opposite each sample represents what?
A. That represents the width.
Q. The next figure represents what?
1586 A. That represents the silver in ounces.
Q. And the third figure represents what?
A. The zinc in per cent.
Q. And the word "Tr." from time to time appearing?
A. That means a trace.

Mr. Kremer: We offer this map in evidence in connection with the other.
Mr. Gray: I might explain that it is samples contained in the first exhibit and also some others.

Tracing marked Exhibit No. 123.

By Mr. Gray:

Q. These assays, were they made for this case, or during the course of work as it was carried forward?
A. Well, the samples with "L" marked in front of them were taken lately, and the samples with a straight mine number, with no letters in front of them, were taken during the course of mining.
Q. When did you sample, as the work progressed whenever you had any vein matter or quartz; was that the idea?
A. Why, I sampled whenever I got down to the tunnels. I was doing the Black Rock sampling at the same time, and I did not devote all my time to the sampling of the tunnels, but I got them at the best intervals that I could.
Q. Wasn't it part of your instructions and part of your
1587 duty, every time any quartz or vein material was developed in a working to take a sample of that?
A. I always took samples whenever any vein was crosscut or whenever anything was developed.
Q. Whenever any quartz was opened up or vein material, did you take a sample there next time you went down?
A. Yes, sir.
Q. Yes; you would go back over a certain working and from the

time you had last seen it, wherever there was any quartz or vein material you would take a sample?

A. Yes, sir.

Q. Now, go up to the Black Rock tunnel No. 1 east; those samples were taken, with one or two exceptions, during the progress of the work, weren't they?

A. Yes.

Q. From Sample 1791 on No. 1 East, the northerly Branch of this working, how far did you go from there before you took another sample along that drift from the crosscut or whatever sort of working this is?

A. Well, it was a distance of approximately 36 feet.

Q. How far did you go before you took another sample?

A. A distance of approximately 53 feet.

Q. In the crosscut or working, whatever it is, just south of that, from station 836 through stations 1114 and 1120 how far did
1588 you go from the beginning of that working there from the westerly end of it before you took a sample?

A. Well, here is a matter of ten feet to this sample here.

Q. Now, going from the crosscut then along the working No. 26, how far was it between samples in there?

A. A distance of 60 feet.

Q. And from the last sample that you took, from 1792 to 1793—you gave that?

A. Yes.

Q. From 1793, to the next sample in that working 1794, how far?

A. Possibly 83 feet. The map shows.

Q. Yes, I know the map shows but I just wanted to call attention to the distances between quartz. You have shown on there all the samples that you took in that assay?

A. Yes, all ore; all on exhibit 123.

(Witness excused.)

Mr. Kremer: It is stipulated that the defendant company is the owner by mesne conveyances of both the Jersey Blue and the Black Rock and are now the owners of the Jersey Blue and Black Rock claims. I desire to supplement the deed from the Clark-Montana Realty Company to Amasa P. Peake by the introduction of a deed from Amasa P. Peake and wife, to A. B. Wolvin, and John F. Kfillorin, and Thomas J. Davis, and then by a deed from
1589 A. B. Wolvin and wife, John F. Kfillorin and wife, Thomas J. Davis and wife to the Butte & Superior Copper Company, Limited, to the property, the date of the first deed being the 15th day of September, 1906, and the date of the second deed the 9th day of November, 1906.

The deeds admitted in evidence and marked Defendant's Exhibits 124 & 125.

Testimony of A. B. Clark, Recalled for Defendant.

A. B. CLARK, recalled on behalf of the defendant testified as follows:

Direct examination.

By Mr. Kremer:

Q. You are the same A. B. Clark who previously testified in this case?
A. Yes, sir.
Q. Mr. Clark, referring to exhibit 100, I will ask you if you are familiar with the workings or drift thereon designated as 403?
A. I am.
Q. Were you ever in that drift?
A. I was there in 1912, the summer of 1912.
Q. What was the occasion of your visit to that drift?
A. I went in there to get the geology of the Jersey Blue vein here.
1590 Q. I will ask you how far you proceeded into and along that drift?

Mr. Gray: What notes are those he is reading from?
The Witness: These are the original notes taken in the mine at that time.

Mr. Kremer: How far did you proceed along that drift?
A. From a point there for 110 feet.
Q. From a point where; what do you mean by that?
A. A point at the junction of 403 and 404, a distance of 110 feet it was an open drift and there was a cave 25 feet in length and then an open space of 40 feet, and then a cave 45 feet in length, and then 20 feet of granite where the vein was encountered in a diagonal course.
Q. Did you measure the width of that vein?
A. Yes, sir. The width of that vein was 15 feet at that point.
Mr. Gray: At what point; where that little crosscut runs there?
A. Where that little crosscut runs there, yes.
Mr. Kremer: And how far along that vein did you proceed?
A. For about 60 feet and then it was caved or filled.
Q. Do you know how wide it was at the point of caving or filling; could you tell?
1591 A. Well, the drift was—the drift along that point was driven along a body of zinc ore about eight feet and a half wide.
Q. Can you tell us how wide it was along either side of that drift—I mean the point towards the west end of it?
A. Across the face of the drift?
Q. Yes.
A. The width of the ore?
Q. Yes.

A. About eight and a half feet
Q. Was that the limitation of the ore?
A. Why, it was caved at that point.
Q. What did you find there; what kind of ore?
A. I found eight and a half feet of zinc ore and I found a clay gouge on the north wall two to four inches wide and quartz, manganese and iron sulphide with eight and a half feet of zinc sulphide and altered granite.
Q. Do you know anything about the percentage of zinc there; any way of telling?
A. I didn't have any assays made of it.
Q. What was the strike of the vein which you have described as having seen in drift 403, and its extent?
A. Nearly north 83 west.
Q. What was its dip?
A. North 88° 30′.
Q. How does that working correspond in elevation, if you know, with our 400 foot level?
1592 A. Well, it was on the 400 foot level run out from the Black Rock shaft.
Q. It is an extension from that level?
A. Yes, sir.

Cross-examination.

By Mr. Gray:

Q. Mr. Clark, where did you get this strike?
A. This strike here of north 64 west?
Q. Yes.
A. I think I got that in the mine at a point along in here, just before reaching the vein.
Q. You refer to this wall on the north side?
A. Yes.
Q. Why didn't you tell about the talc wall of the south side that you have on your notes?
A. The talc wall is not on the south side; that is the drift runs through there. It is caved.
Q. Don't you show a talc wall on the south side of that drift?
A. No, sir; there is the cross section of it.
Q. Will you just indicate on your notes by some sort of a letter or something where you have this talc wall on the north wall that you have referred to; give it the letter Z.
A. At that point, and also at this point over here.
Q. All right; make another Z; at the two points Z?
A. Yes.
Q. Now, at the most easterly point Z what is this intended?
1593 Isn't this intended to represent a talc seam as shown on your notes?
A. No, sir, it is not.
Q. Just point that out to the court.
A. The air was very bad, on account of these caves, and this was simply a sketch made in the mine at the time.

Q. Show the court where you put the letter Z.
A. Here and there. I did that to get the strike of this vein for this 60 feet; that is where I got the strike of that vein.
Q. The most easterly Z is just east of the little cross cut at the end of which appears 92608 on exhibit 100, isn't it?
A. I should say that that was about the point where that black line is put, that I observed that wall, and I think probably that that drift—I don't know whether that runs north 86 west or not; there was a talc wall on this side of the drift where the ore was cut and also on the south side of the drift in here and the portion between those two points was ore.
Q. Which wall was it that the working first cut, the south wall?
A. The south wall, yes.
Q. And that is where the talc was?
A. No, sir.
Q. Isn't it where you show it upon your notes, and don't you show the ore on the northerly side of the talc seam, Mr.
1594 Clark, and show the talc seam as the southern boundary of, the ore?
A. I do on that portion of the sketch, but here I drew a diagram of that as the vein appeared, as you looked at a cross section of it.
Q. Yes, I know. Have you any objection to marking these notes and leaving them here as an exhibit?
A. No, sir.

Mr. Kremer: No, we don't object.
Mr. Gray: I will ask to have it done and have the notes marked.

(Notes marked Plaintiff's Exhibit No. 126.)

Redirect examination.

By Mr. Kremer:

Q. What is this that appears in the upper right hand corner of your notes?
A. That is a cross section of the vein as I saw it in that drift.
Q. When was that made?
A. In July or August, 1912.
Q. At the time that you saw the vein?
A. Yes, sir.
Q. Was that made under ground?
A. Yes, sir.
Q. In the presence of the vein, while you were looking at it?
A. Yes, sir.
1595 Q. Does that correctly depict the condition as you saw it?
A. It does.

(Witness excused.)

Mr. Dickson: Before closing, I would like to request permission to withdraw Exhibits 117, 118 and 119 that were introduced by Mr. Morse when on the stand, so that he may be permitted to make a tracing of the same on an enlarged scale corresponding to these

other maps, of 20 feet to the inch, and then, of course, we will return the originals with the tracing.

Mr. Gray: We have no objection if he will bring back the originals.

The Court: Very well.

Mr. Dickson: There is one other suggestion I have to make. It appears from the testimony of Mr. Burch that in company with him and Mr. Finch and Mr. Wiley there was also Professor Salisbury and Dr. Emmons, who went down on the 1300 level where the timbers had been removed and made their observations. I did not think it necessary to put on Dr. Salisbury and Dr. Emmons to testify to the same matter, but they are here in court, and if the gentlemen on the other side care to, they may call them and cross examine them as though they had testified substantially as the other witnesses did.

Mr. Gray: I think that would be only cumulative. If you don't want to call them on direct we won't call them on cross examination.

Defendant rested.

1596 PLAINTIFF'S REBUTTAL.

Testimony of Walter M. Bickford for Plaintiff.

WALTER M. BICKFORD, called as a witness for plaintiff in rebuttal, after being duly sworn, testified as follows:

Direct examination.

By Mr. Folsom:

Q. Please state your name, residence and occupation?

A. Walter M. Bickford, age 63; I reside at Missoula, Montana.

Q. What is your business?

A. Lawyer.

Q. How long have you practiced in this state?

A. 31 years and over.

Q. Where did you practice during the year 1906 and prior thereto?

A. Why, for some years I had been in Butte, Montana.

Q. What position, if any, did you hold in 1906 with the Clark-Montana Realty Company?

A. At that time I think I was secretary of the company.

1597 Q. Do you know who prepared the deed that was introduced in evidence from the Clark-Montana Realty Company to Mr. Peake?

A. I think I prepared it myself, or at least dictated it, or part of it.

Q. Where did you get the language that was used in that deed?

Mr. Dickson: We object to it as incompetent. The deed must speak for itself.

Mr. Folsom: I want to show that it was copied from a printed form.

Mr. Dickson: That is objected to as incompetent.

The Court: What is the object?

Mr. Folsom: It goes to the question of intent. They claim that this deed has some peculiar significance, and it brings it within the language of a certain decision of the Supreme Court of the United States, known as the Drum-Lummond case.

(Objection overruled; defendant excepted.)

A. Why, largely from a printed form which was in general use in Butte at that time.

Cross-examination waived.

Mr. Folsom: I desire to prove the resolutions of the company.

Q. I hand you a book and ask you if you know what this contains; what this book is?

A. This book is the record book of the Clark-Montana Realty Company, volume 1.

1598 Q. I call your attention to the entries on page 72 and ask you what these entries are.

A. It is the minutes of the meeting of the Clark-Montana Realty Company held on the 26th of October, 1906, a special meeting of the directors or trustees of the company held on that date.

Mr. Folsom: I offer this resolution in evidence and I have a copy of that which I would like to substitute and withdraw the book.

Mr. Dickson: For what purpose is it offered?

Mr. Folsom: To show the intention of the parties in making the deed.

Mr. Dickson: I object on the ground that it is incompetent, irrelevant and immaterial. The deed must speak for itself as the final writing between the parties.

Mr. Folsom: Also to show that the language used in the deed was beyond what was authorized.

Mr. Dickson: I object as incompetent, irrelevant and immaterial. The deed has stood for fifteen years unquestioned.

The Court: For what purpose; to show what was authorized by the company?

Mr. Folsom: Yes, and also to show the intention of the company in making this transaction. It is part of a continuous transaction. There was first an option which I should have introduced, except I wanted to get rid of Judge Bickford.

The Court: Intent is not shown by the grantee.

1599 Mr. Folsom: It will show that it was recorded, and there was a series of transactions.

The Court: The objection will be overruled.

The defendant excepts and exception allowed.

Mr. Folsom: May I submit the certified copy?

Mr. Dickson: Certainly.

The certified copy of the resolution admitted in evidence and marked Plaintiff's Exhibit 127.

Mr. Kremer: There would be the further objection, not to the form, but to the resolution itself, for the certified copy shows that the alleged copy of the minutes was not recorded until the first day of May, 1907, and therefore would not constitute a notice.

(No further ruling.)

Mr. Folsom: I offer in evidence certified copy of an option agreement dated the first day of August, 1906, in which the Clark-Montana Realty Company is the first party and Amasa P. Peake is the second party, which option agreement was recorded in the office of the county recorder, October 31, 1906.

The Court: For the same purpose I assume.

Mr. Folsom: Same purpose.

Mr. Dickson: Same objection.

The Court: Same objection, yes. Objection overruled and exception may be noted.

The option admitted in evidence and marked Plaintiff's Exhibit 128.

1600 Mr. Folsom: I now offer an exemplified copy of the patent record in which the patent to the Black Rock claim was issued for the purpose of showing what was adjudicated.

Mr. Dickson: I object to that as irrelevant and incompetent. We have not attempted to carry our title back of the date of final entry and issuing of the patent.

Mr. Folsom: But you claim there was a failure to adverse and you got certain rights by reason of that.

The Court: Objection overruled.

Defendant excepted.

The patent admitted in evidence and marked Plaintiff's Exhibit 129.

Mr. Kremer: It might properly have been stated before we close, but before you offer any further evidence—it will be admitted that ore was taken by the plaintiff company from the ore bodies below where the plaintiff contends to be the point of union.

Mr. Gray: Beneath the point of union, that is true.

Professor Irving Recalled for Plaintiff.

Professor IRVING, recalled in rebuttal, testified as follows:

Direct examination.

By Mr. Gray:

1601 Q. Mr. Irving, have you examined the two sections of glass which Professor Emmons presented and which purported to give the dip of the Jersey Blue vein on both sides of the Black Rock fault?

A. I have.

Q. Have you prepared any sections which are taken at right angles to the vein?

A. I have done so.

Q. Will you present them, and in doing so simply state the reason sections taken at the angle—that—the two sections prepared by Professor Emmons were taken at, give or present somewhat of an optical delusion or illusion?

A. I think before I explain what I mean, that there is some misconception obtained from looking through these sections at a right angle to the section, I had better make one or two sketches to show the principle on which I have reconstructed a new set of sections to illustrate the same thing. Before drawing this section I should like to say that I have been over these sections of the witnesses for the defendant and checked them and I find that the points connected by these lines, as cut by these two sections, are essentially correct. That is to say I do not find any material difference in the plotting of the points on these two sections, as I make them from the sections as indicated there in that glass model.

Whereupon the drawing made by the plaintiff was admitted in evidence and marked Plaintiff's Exhibit 130.

1602 If we indicate the blue line on exhibit 130 a plan and let the section come below the blue line, we will then indicate the vein in plan. I will write the word "plan" above. That may be intersected by a section indicated by the red line at right angles to the strike. One looking along the strike of the vein, that is the direction indicated by the red arrow would see this vein here, if it had an undulating course, dipping first a little in one direction and then in another, with its true dip, inasmuch as the section is at right angles to the strike of the vein. On the other hand, if we have indicated there a section, we will take at an angle of say forty degrees or thereabouts, which is approximately the angle which this section cuts the Jersey Blue vein, and what we believe to be the south continuation of it, then you would have these varying dips correctly indicated on the section as you look at it, because you are looking at the section at right angles to the section, so, and on that section there would appear, this being the surface here "S"—in both of these, cut—the consequence is that that vein would have some such appearance as that. If again a third cut was made, cut at a very very small angle, say two or three degrees, the dips would be so much shallowed that the section might have an appearance something like that (indicating). In other words, a portion of the irregularity of that south segment as indicated in that section is disturbance along the strike of the vein as well as along the dip.

1603 The Court: The vein carried along on the angle?

A. Exactly. Now, I have prepared two glass sections taken at directly as nearly as I could get them, at right angles to the strike. I will have to locate them properly on this glass model.

Mr. Dickson: If your honor will permit me at this time, there is a matter which I overlooked before we rested and it is this: There has been some new work done by the plaintiff, as I understand, since they closed their case in chief. It was not examined or seen by any of the experts on our side until yesterday afternoon. We do not know what, if anything, the plaintiffs will claim for that new work, but if they claim anything for it of course we reserve the right to meet it in rebuttal.

Mr. Gray: That is in the Jersey Blue?

Mr. Dickson: Whatever new work you have done.

Mr. Gray: That is all right, we are not going to be technical with you.

The Court: If there is constant new work, showing new aspects, perhaps this case would continue for a year.

Mr. Dickson: I think the work ought to stop now.

Mr. Gray: It will. I am going to be brief in rebuttal.

A. Now, these two sections were taken as nearly as I could
1604 get them in the same place or about the same place as the other two sections that were introduced by the defendant, parallel to the Black Rock fault. His sections had a direction of north 65 east, as indicated by these lines running at an acute angle to the Jersey Blue vein at its south segment, about at an angle of north 15 degrees east, which is approximately at right angles to the Jersey Blue vein. The strike changes, however, from level to level, so that I cannot be quite sure that it is everywhere exactly across the strike, but one can see that the amount of the distortion of the Jersey Blue south segment as compared with the Jersey Blue north segment—that there is not a serious discrepancy in the amount of curvature and the direction of the curvature in the two. It is slight, and to my mind that amount of discrepancy in the dip and the general physical features of the vein, the configuration of the vein, is not a very serious difficulty in correlating the two across a space of 105 feet. If you remember that you want simply to correlate a section of the vein taken at this point and another section taken at that point, and that you are correlating the two segments across a fault, and that the other side of the fault on which this segment is taken is independent of the wall on which No. 2 was taken,—consequently you must remember that in the movement of that
fault—I don't know how much it is, only approximately, or
1605 in what direction it has been, but I do know that there has been movement along the Black Rock fault, as everyone admits; during the movement of the fault the two walls were liable to be considerably distorted, and the distortion of those two walls is not going to be the same on both sides of the fault; they are independent; therefore whatever distortion or difference there may be in these two might very easily have come about through the movement of the two sides of the Black Rock fault, and there you have the irregularity due largely, on their sections, to the angle at which the section was taken, and in the second place the correlation across the fault, where the distortions may have been different.

Those things being considered, looking at those two veins with the approximate strike of each, I think no serious mental obstacle is offered to correlating the two with each other.

(Glass plates marked Plaintiff's Exhibits Nos. 131 and 132.)

Q. Your pane No. 1 is on which side of the Black Rock fault?

A. On the north side; and on Plaintiff's Exhibit No. 4 I have marked the westerly section No. 1 and the easterly section No. 2, and with my initials, so that they may be identified.

Q. Have you visited the 1300 foot level of the Black Rock in the last few days?

A. I have.

1606 Q. The place where Mr. Dickson devoted so much time today. State what you found there?

A. The upper level of the stope not being indicated on this Exhibit 22 of the plaintiff, I have a surveyed outline of those stopes, which I will place over the map, Exhibit 22, and determine the position of the observations which I made. I will indicate here with the end of my pencil the raise which I understand is known as the Clark Raise. I came down that raise from the 1200 Black Rock, and made observations as well as I could down the raise to the 1300 foot level. At the bottom of the raise in the manway, one floor up above the 1300 sill floor, on the south side, I looked upward and westward, and there I saw a vein on which I took the following notes: "10 to 18 inches of quartz with some gouge, cutting the Rainbow banding." The Rainbow banding seemed to me to come in on the south side of the raise toward this vein in which I saw quartz which seemed to me to be banded and dipping in a southerly direction.

Q. What was dipping in a southerly direction?

A. The vein which cut the Rainbow lode. I say dipping in a southerly direction—I may not be quite correct there; that is an error; it is practically vertical at that point. That vein had a northwest strike. It was not a very easy place to trace the strike in, so

1607 that I do not feel absolutely certain that the strike I took was exactly correct. I have it north 70 west, but I think it is probably more east and west than that. I could not get in in such a way as to get a very good strike direction. That seemed to me to be in its general appearance what I should have considered to be very like the Jersey Blue vein, or a strand of it; whether there was more of it off in this direction or not I don't know; I did not see anything there. I don't think that the lagging permitted observation. I don't remember about that point. The Jersey Blue vein is not always made up of one single layer of vein material, or one single layer of gouge; it is sometimes made up of several. But that was very striking in the roof. Now, there is material north of that up in the raise, and what it should be referred to, I am not sure; whether it is a portion of the Rainbow lode or a portion of the Jersey Blue; I don't know; I could not make up my mind. The point at which I could observe it was too small a portion of the material.

Coming down the mine I thought first that this material in the mine was a portion of the Rainbow on the other side of the Jersey Blue but I would not be certain of that. From there, having come down the mine, I went over and up into this stope.

Q. That is, you went easterly along the sill floor along the 1300 drift and went up into the stope?

A. Yes, and went up into the stope.

Q. At the point marked——

1400 A. I went up into the stope at the point where this pencil is located, and there was on the 7th set on the west side of the stope, south of the north bunker of the stope as it existed at that time, climbing up that mine, I then saw on the first floor—I am not sure of the sequence of these observations, and so I will just state the observations without any reference to their sequence—I went in the 8th set on the first floor in the west side of the stope, and then having a direction as near as I could get it of north 85 west, with a dip of 70 degrees to the south on the first floor—I climbed to the second floor.

Q. That is all in the Rainbow vein at that place?

A. Yes. I might say that at that point the structure of the Rainbow lode is not particularly clear. I don't think I could see at that point any definitely marked banding; at least I remember none. Climbing to the second floor a little bit further to the north in the same set, that is, in the sixth set south, I found the same vein in the west wall. There I took an observation of the strike, north 67 west. I think that is probably incorrect. It is not very easy to get the direction, because it was right in the wall. Then I climbed to the third floor, and in the 7th set on the same westerly side of the stope—that is, one set further north, but a little over half the way between the south and north sides of the fifth set, I found the same vein, which we checked up with a light below, to be sure that we 1500 were on the same feature—in the west wall of the stope. It is difficult to trace across the roof of the stope, but after climbing up on the top of the fourth floor I could see about two sets up into the roof, and looking westward I could see a stringer—what appeared to me a very easily discernible vein going across the roof of the stope and joining with the material that there was on the west wall. I will read what notes I took of that.

A. (Continuing:) "Nearly vertical, very strong wall, opening Rainbow material, good gouge, north 80° west." That is on the edge of the third floor; that is on the third floor on the west end, climbing up over the timbers. I took this note of what was in the roof, two sets up in the roof—that is to say what seemed to be two sets above the third floor. "Beautiful vein, unmistakably Jersey Blue, about six or eight inches good vertical zinc in it."

Q. In your judgment is this the Jersey Blue vein that is shown there cutting through the Rainbow vein?

A. I consider it to be either the Jersey Blue or a strand of it. Whether there is more or not in there I do not know.

Cross-examination.

By Mr. Ellis:

Q. Doctor, I wish you would pull down the 800 level of the Elm vein.

Mr. Gray: May I have this drawing that has just been referred to by the witness marked as an exhibit?

1030 The drawing admitted without objection and marked Plaintiff's Exhibit 132.

Mr. Ellis: Dr. Irving, I wish you would indicate in pencil the plane of the section represented by the glass plates that you have introduced in your direct examination.

(Witness indicates.)

Q. Now, you have indicated on plaintiff's exhibit 11 the plane through which the glass sheets 1 and 2 were drawn by you, were passed?

A. I have.

Q. And I understand you to say that these planes were passed at right angles to the vein?

A. They are approximately at right angles. One can see in this portion of it right here, 5865, approximately at right angles. There is a variation in strike there so that I couldn't get that exactly at right angles.

Q. And the planes of the two glass sheets as indicated on exhibit 11 of the plaintiff was shown to pass right through the Black Rock fault, won't they?

A. They are.

Q. In your judgment and in your experience, Mr. Irving, is that a correct way to interpret the dip of a vein and how it been your practice so to do?

A. I don't quite understand you.

Q. To pass sections parallel to each other through the faulting plane of a vein?

1031 A. That is not going to have any particular significance as to the vein, so long as the vein continues downwards. It is true that there are two points on this north section which are considered to be pretty well known, where I have been obliged to project the vein along the strike about 25 or 30 feet, but aside from that if it was projected on level after level of the vein, and whether it goes through the fault or not, seems to be more or less immaterial.

—Well, do you consider in your judgment, doctor, is it a fair representation of the dip of the vein to pass a section through that vein which cuts the fault which faults the vein on one side and on the—pass another section parallel thereto through the fault, cutting the same vein; is that fair or is it sound.

A. Well, suppose I should——

Q. Just answer the question?

A. Certainly. And I would like to explain. That easterly plane might have been stopped before it reached the fault. It would certainly show the configuration of this vein from level to level. The same way with this one here except on these two places where I have been obliged to project a little along the strike, in order to keep the planes 105 feet apart, the same as the witnesses for the defendant did—except for these two points on this line here, I might very easily have stopped the plane before it reached the fault. Then you would have two places, one on either side of the fault, neither reaching it, giving the configuration of the veins on this plane.

1612 Q. Isn't it unusual, when you are correlating or attempting to correlate any vein which has been faulted by passing a plane through the vein parallel to the line of fault?

A. If I were going to try and correlate absolutely in the closest possible position together of the two separate portions of this vein, the best way to do would be to get the traces of the vein where it actually intersected the fault. But you have got an original faulted surface in there, and it is an extremely difficult thing to depict.

Q. But it is true, isn't it, where you are endeavoring to correlate and compare, to correlate sections of a vein, as you say to pass a plane through?

A. No, I don't say that. I say if you have got the traces on the surface of the fault.

Q. Is it not a proper thing to do to pass your section parallel one to the other through the vein and not to intersect the faulting?

A. Most certainly not. I don't think so at all. I think the thing to do is to get the sections so that they cut the vein at a right angle, or as nearly to it as you can get. Then they appear in their true and correct dip on the two sides as you are looking along the vein—and you can look along the vein and see its continuation on the opposite side.

Q. In your examination in chief in this case you drew a diagram, doctor, did you not, wherein you were analysing fault displacements?

1613 A. Yes.

Q. And you stated then that you determined the throw occasioned by the fault by finding a trace of the vein on both sides of the fault, did you not?

A. I said—yes, I think that is correct. I said that if, given the case of a fault looking right at the face of a fault, getting a trace on that fault of the two sides absolutely determined in both cases, it would then be possible sometimes,—not always—to determine the displacement, but the amount and direction of it would not necessarily be determined by that.

Q. And you also testified in that same connection, did you not, that the dip of the fault in this faulting plane was not the true dip, but that in effect the displacement of the vein could be found only in this way?

A. I don't remember testifying just exactly to that—in that way, that displacement of a vein could be found only in this way. As I

recall it, I said that as long as the direction of movement—trace direction of movement—this trace of two intersecting sections of a fault, I said dipped a little along on either one of these traces, in that fault surface, that then it was possible for us with a downward movement, to have displacement in different directions. That is as I recollect it.

Q. That being true, isn't it true then that the relation of a vein on the opposite sides of a fault would be shown best by planes parallel to the fault?

A. No, certainly not. Now, these placed at 105 feet apart,
1614 the fault is not vertical and the conception you get is distorted, the way these two glass plates show the distortion. You can see by comparison the difference between the two, and unless you can get the absolute faulting surface and can construct it and set it up in a model and put the absolute trace of the vein on it, I don't believe that that statement is true.

Q. Now, assuming, doctor, that you would pass your plane of section parallel to the Black Rock fault in this instance you would find the dip of the vein to the northwest of the Black Rock fault, undisturbed, just as represented by Dr. Emmons on his plate 1, wouldn't you?

Mr. Gray: Where is that; how far out?

Mr. Ellis: 105 feet—110 feet, I don't care.

Mr. Dickson: Fifty-two and a half feet on either side of the fault?

A. If you mean to ask whether the planes—the point passed by him on the two glass plates are essentially correct, that is true. I have checked those points.

Mr. Ellis: Now, wouldn't you expect in a vein of the regularity that you claim this Jersey Blue vein has, and not being able to find any appreciable displacement of the vein to the southeast of the Black Rock fault, wouldn't you expect that vein to traverse the country in its regular way, if it had northwesterly before?

1615 A. You mean would I expect it to have exactly the same undulations, the same configurations on dip?

Q. Approximately so, yes?

A. Not necessarily so at all.

Q. Not necessarily, but wouldn't you expect it to have practically the same position in the ground southeasterly of the fault that it had northwesterly of the fault, when you were unable to determine any appreciable displacement of that vein by the Black Rock fault?

A. If there was a fault, as there is, of such magnitude as the Black Rock fault, aside from any question of the amount of displacement, which might have been very much greater in the vertical direction than we know anything about, aside from that, with a fault of such magnitude, I should certainly not expect that there would be the same configuration on both sides. There might and there might not. That is a thing about which I have a right to have no specific expectations.

Q. And if you should place two planes of section one a given distance northwest of the Black Rock fault and one a given distance

southeast of the Black Rock fault through your alleged vein to the east, and you found a condition there as to dip, such as *it* found in Dr. Emmons' plate No. 2, wouldn't you conclude reasonably, doctor, that—from the point through which the plane passed on the
1616 alleged southeasterly segment of your vein, did not belong to the vein that you had northwesterly of the fault?

A. I would not. The first thing I would do then would be to make sure that I had the correct idea of the configuration and make a section that went across the strike, the two sections, compare them with each other. Then, knowing as much as I do about the effect of faults on locations, I should not be materially worried by a correlation across that space. I have seen places where the structure on two sides of a fault was distorted so different that you wouldn't believe, in seeing the two, if you did not know about faults, that the two were to be correlated with each other. In this instance I don't think it is difficult with these two sections, I believe that they—offers no particular obstacle to my mind in thinking that they go right through there.

Q. Did you in your professional experience as a member of the Geological Survey ever place faulting sections of vein, ever pass the section through the fault in the manner in which you have done it or draw the plane through parallel to the fault?

A. I don't remember whether I ever placed that through the way I have done here or not, as to correlating a vein across a fault; I have no recollection of having done that. But if I did do that I certainly wouldn't do that at an acute angle to the strike, because I would know that would give an incorrect impression of them.

1617 Q. Now, this section which has been tendered here by the plaintiff is subject to the same criticism to which you subjected the section of Dr. Emmons, is it not?

A. I should say not. These sections that I have made are correctly drawn through the country. They are made along lines that run north and south. You cannot change the sections and run them every which way and give any clear idea of things at all. If you make the sections at such angle as we have made, where they meet the veins at angles which show a change in the dip or the actual direction of the dip—you do not find that on sections made at right angles to them, but as I say, sections at right angles or that they give an incorrect representation—if you ask if they are subject to the same criticism, I should say no, because the principles which govern their construction was entirely different.

Q. However, as I understand from your testimony the sections prepared by Dr. Emmons and represented on the two plates of glass, were a correct representation in the ground through which the plaintiff's sections were passed?

A. They are a correct representation of the points, on the two segments of the vein through which those sections passed. I have checked them and found the points to be essentially correct. They are not made, however, in a correct method of determining
1618 what the true dip of the veins, the two segments of the vein on the two sides of the fault are.

Q. Now, as I understand your testimony, you say the Jersey Blue vein or a strand of it you saw on the north boundary of what is shown upon this Exhibit 22, over which you have placed the stope tracing, did you?

A. I didn't see it on the north boundary as indicated on this tracing. It was on the southwest corner of the raise.

Q. Outside of the raise?

A. Almost outside the south side of the raise. I could look up at it and see it.

Q. I understood you to say that the strike of that vein as indicated by you on your map was north 70 west?

A. I said that was about what I marked it but that I thought it was more nearly east and west than that.

Q. And its dip was to the south?

A. I said first that the dip was to the south in my testimony, but I corrected that and said that it was practically vertical. It might even have a little—well, it is practically vertical in there. I did not take an observation of it at that point; I should have done so but I did not.

Q. As you looked at it with its vertical dip and the east and west strike, you had it cutting the vein material of the Rainbow lode?

1619 A. I didn't say that it was an east and west strike; I said it was more nearly east and west than north 70 west, but it cuts across the timbers in a general east and west direction.

Q. And you saw it cutting the ore of the Rainbow lode?

A. I saw the vein cutting down in this direction vertically, looking up there in the west side of the stope, I saw zinc ore on the side of it, what I would take to be evidences of banding; not so clear as they are in some other places, however.

Q. Which vein was it, the Jersey Blue or the Rainbow vein?

A. The Rainbow vein. On that north side it was the Rainbow vein.

Q. Had the bottom of the raise cut into the Rainbow?

A. I can't tell you; I don't know; I couldn't see it.

Q. Didn't you say that at the bottom of the raise it had cut into the Rainbow at that point?

A. I don't remember making that statement. The portion of the raise that I could see was up above the timbers of the first floor, and whether it was Rainbow material on this side there I am not sure, because you cannot see much of anything in there.

Q. What did the raise cut at the bottom?

A. I don't know.

Q. Couldn't you see?

1620 A. No.

Q. Was it lagged so tightly that you could not see?

A. I don't remember about that, whether it was timbered or not.

Q. What is your opinion about it, that it cut the Rainbow lode at that point?

A. Why, I think it should; I think there should be Rainbow ore

on the south of it; whether there is Rainbow ore on the west of it or not I could not be sure.

Q. Did you see south of that point what you claim is the Rainbow lode or the Jersey Blue lode cutting the Rainbow lode?

A. I beg your pardon?

Q. South of that point how far have you painted the Rainbow lode or the Jersey Blue cutting the Rainbow on this map?

A. I haven't painted it at all.

Q. How far southerly have you represented it on Exhibit 22, the Jersey Blue vein as cutting the Rainbow vein?

A. I haven't represented it myself at all. I will say that on this map——

Q. Well, according to the map?

A. According to the map the north wall of it is represented as 16 feet south of the south wall or south edge of the raise.

Q. Let me look at Section 9, Plaintiff's Exhibit 37. On
1621 that section where is the Black Rock raise shown on the 1300 foot level of this section?

A. You mean that raise that I have just been speaking of? It is not represented on that section.

Q. Where would it be on that section according to your idea?

A. Well, I can only say approximately, but to say with absolute certainty that these indications are correct I would have to have survey notes to plat that, and it has never been platted on that section.

Mr. Dickson: The Professor has already on that map indicated the point where the bottom of that raise would come on the 1300 I think.

The Court: Well, I will give the Doctor an opportunity to plat that. We will suspend until tomorrow morning.

By Mr. Ellis:

Q. Dr. Irving, have you fixed upon section 9 the position of the Clark raise as I requested last evening?

A. I have not fixed it on the section. I have determined the position of the raise on the Elm Orlu map from notes secured from the Black Rock, from the Butte & Superior Company. The fixing of the raise on section 9 is to be determined by the direction in which it is projected. It should be projected in the direction of strike of the Jersey Blue vein, which appears in the raise, and I haven't got that strike exactly. It is somewhere about north 75° west. I said I
took it as north 70 west but I thought it was a little more
1622 nearly east and west than that—I should say about 75°. I haven't got the data to project it on here with absolute accuracy on the 1300 level.

Q. But you have located it on the plan map?

A. I have located it on the plan map. It comes right at this point (indicating), and I can give you the east and west distance from the section.

Q. How far from the Clark raise at center is it, the center of what is painted blue on this map as the Jersey Blue lode?

A. From the center of the Clark raise as it appears on the 1300 southward to the north edge of the projected position of the Jersey Blue, or the blue mark, on this map is eighteen feet; on exhibit 22.

Q. And the center of what is painted blue, what would be the distance from the center of the raise?

A. From the center of the raise?

Q. Yes.

A. A little over 21 feet; between 21 and 22 feet.

Q. And I understand you that in the Clark raise you have disclosed the Jersey Blue vein?

A. I have seen what I consider what is a strand of the Jersey Blue vein.

Q. How many strands has the Jersey Blue vein, doctor, in that vicinity?

A. In that vicinity?

Q. Yes.

A. I don't know; that is one of them.

Q. How many have you——

1623 Mr. Gray: Let him finish please.

A. (Continuing:) That is one of them and I should like to explain that the mark which I have been measuring painted in blue on exhibit 22 is a projection of the assumed position of the Jersey Blue without any information, so far as I know, on this level. It may be that some one else has gotten some that I don't know about. So that, instead of it being very far out I am surprised to find that it is as close to the strand here in the north—maybe nearer the south,—as it is.

Q. The assumed position of the projection of the Jersey Blue as shown upon this map is 22 feet in the—or 21 feet in the one case and 18 feet in the other, from the actual position on the ground, as observed by you, is it not?

A. If the actual position of a strand of the Jersey Blue—and there may be more strands—is the position in which the blue is painted, I don't know.

Q. How many strands of the Jersey Blue vein have you been able to identify in that vicinity?

A. I have identified the one that we have mentioned in the raise, I have identified one which I spoke of in the new stope—speaking of the sixth set south from the north side of the stope in my testimony yesterday, and that is all that I know of in there. Now, I don't know whether those are separate strands or not, but I think they probably are.

Q. Can you correlate your strand that you say you found
1624 in the Clark raise with any other strand to which your attention has been called in the stope?

A. I do not; I think those are probably overlapping strands. When you get a great vein, or a vein coursing through the country in this direction, and follow it, you find that it is divided into more or less overlapping strands, and you cannot say that one strand—you cannot label them A, B, C and D and follow them right through

the country; it is just as true in the granite as when you get in the vein and the ore. All we do know is that when we cut this vein here we find evidences that here is one strand at that point, and whether there is another immeditaely south of that raise, I don't know.

Q. And this strand—these strands or branching of this which you have just described, is incident to the great veins traversing that country?

A. It is. That is it.

Q. Have you found any other place where the Jersey Blue vein branches or contains several strands?

A. I should say that there are quite a few places in which there are more than one gouge when it cuts through the granite, and more than one layer in it. I don't know that I can mention any specific case.

Q. You cannot point out any others in the Jersey Blue?

A. I probably could if I were to go through my note book, but I cannot do it off hand.

1625 Q. What was the direction of this other strand of the Jersey Blue vein that you identified?

A. In the stopes?

Q. Yes, sir.

A. I have taken it; I gave those directions yesterday. The measurement on the first floor was north 85 west, and the dip was 73 degrees to the south. On the second floor it was north 67 west, but that was not a very good determination because I could merely see it in the wall, and I could not get two points on it.

Q. Was that the same strand you have been speaking of?

A. The same one. In the third level I have a statement here "dip indefinite but steep toward the south." I could not get an exact dip there, and the direction at that point was north 80 west.

Q. What was the appearance of that strand of the Jersey Blue vein as you observed it in the stopes; what enabled you to identify it as the Jersey Blue and cutting the Rainbow?

A. In the first place it was shown along the line of the strike of the vein in about the point where we should expect to find it, or close to that; and in the second place it had a good streak in the top of the stope of zinc ore that was banded, with a gouge on it, a pretty good gouge, and resembling in general appearance the Jersey Blue material.

Q. In cutting that banding of the Rainbow lode at the place where you observed it; was it cut?

1626 A. I could not observe any banding in that stope very definitely to decide whether it was cutting across the banding or not. It dips in the opposite direction to the banding that the ore usually dips.

Q. So far all that you can say it does not cut any structure which would correlate it with the Rainbow vein, this strand of the Jersey Blue don't cut it at all, does it?

A. It cuts across at an acute angle on the strike of the banding,

which appears, where the ore is banded a little further north, and dipping toward the north; but at that immediate point I cannot see any banding in the ore.

Q. And as far as your observation goes the only reasons you have for believing at that particular point that that is a strand of the Jersey Blue vein cutting the Rainbow vein is that you have eight inches of zinc ore in a pretty good gouge, and because it is apparently dipping to the south, cutting through a large mass of ore?

A. Apparently dipping to the south—that is not the only reason, because the zinc ore that is in that, parallel with the gouge, the vein material is clearly distinct from the ore on the sides; it forms a vein which shows in the roof beautifully.

Q. How large is this strand or streak of the Jersey Blue as you observed it?

A. It is narrow; I should say from memory—I haven't got that noted—that at the west side of the stope it is somewhere
1627 about 12 inches wide, approximately, and in the top I have a note that says there is somewhere between six and eight inches of good vertical zinc in it, and by vertical I mean parallel to the direction of the dip of the vein.

Q. In your judgment is the strand of the Jersey Blue vein which you observed from six to eight inches thick in one case and twelve inches in the other, is that the south branch of the Jersey Blue vein?

A. I don't know. There may be another strand south of that as far as I can tell.

Q. Is the strand which you found in the Clark shaft the north boundary of the Jersey Blue vein?

A. I don't know that either. There is ore, as I stated yesterday, coming down in that raise to the north of that, a distinct and beautiful strand that you see over the first floor of the bottom of the raise, looking west; there is ore in the raise north of that and that may be part of the Jersey Blue also.

Q. You have identified, have you not, doctor, the Jersey Blue vein from the uppermost levels down to and into the 1300 foot level through the Clark raise?

A. There are a good many places where I cannot see very much in that raise. I couldn't be absolutely sure that that vein is on the raise all the way. I can show you the notes all the way but I couldn't say definitely that I can identify it all the way down. I think they probably followed on the ore but I don't know.

1628 Q. Isn't that your judgment that they followed it from top to bottom on the Jersey Blue vein?

A. I have no means of knowing that other than the notes we took.

Mr. Dickson: I think they admitted that.

Mr. Gray: I did not mean to say that it was within the vein through every foot.

Mr. Kremer: Here is the model in evidence. I think that will be controlling.

Mr. Gray: I am not making any question on the continuation downward of that vein.

The Court: Your admissions don't go so far as to admit it is exposed at every point in this raise.

Mr. Gray: Yes, it does not go that far. However, a part of it is lagged and we can't tell.

Mr. Ellis: It is lagged up in certain places but substantially every foot of the way that raise is driven in the Jersey Blue vein?

A. I don't know with this exception: near the bottom of the raise I was not sure whether I had seen Rainbow ore on the north side of the Jersey Blue or not.

Q. You were not sure whether it was Jersey Blue or whether it was Rainbow, were you?

A. I couldn't see more than just a little bit of material through the timbers and that wasn't enough to give me any idea of the direction of the vein or anything else.

Q. Now, doctor, tell me what you did see in the raise that
1629 you call a beautiful streak?

A. What I saw as this beautiful streak?

Q. Yes.

A. At the bottom of the raise here on the south side just over the timbers of the first set I saw ten to eight inches of quartz with some gouge cutting the Rainbow banding with a practically vertical dip.

Q. Now, as I recall your testimony you testified yesterday that standing on the fourth floor in the stopes you looked up and noted a most beautiful vein unquestionably the Jersey Blue. Am I stating in effect your testimony?

A. Well, in effect. I don't know that I used exactly those words, but that is what I consider a strand of the Jersey Blue. I think I said strand.

Q. I will refer to your testimony: "On the edge of the third floor, that is on the third floor at the west end"——

A. Yes.

Q. (Continuing:) —"climbing up over the timbers I took this note of what was in the roof two sets up in the roof, that is to say what seemed to be two sets above the third floor "beautiful vein unmistakably Jersey Blue about six or eight inches, good vertical zinc in it."

A. That is the note, just as you read it, with the adjectives added, that is correct, sir.

Q. And you consider that to be either the Jersey Blue vein or a strand of it?

1630 A. I do.

Q. Now, was that a third strand which you observed?

A. That is one of the two that I have been speaking of.

Q. That is one which you had observed in several floors as you went to the north in these sets?

A. In the stope, as I went to the north, but very little to the north. I think I described that carefully there.

Q. Now, did you observe anywhere in these stopes any other evi-

dences which led you to believe there was there present any other strand of the Jersey Blue?

A. I have no notes to that effect and I remember no such observation.

Q. What, in your judgment, is the width of the Jersey Blue vein where you observed it in the stope from the southerly side of the strand which you have mentioned to the northerly side of the strand which you say is the Jersey Blue in the Clark raise?

A. From the southerly side of the strand I say was stoped to the northerly side of the strand I saw in the Clark raise?

Q. Yes.

A. I can give you a rough estimate of it; I can't give it exactly, because the two are not observed at the same place.

Q. Will you give us your best judgment of it?

A. I will have to use a protractor I think here. If the two
1631 strands maintain their direction until they come opposite one another and do not converge or diverge in any way, there would be approximately eighteen feet between them.

Q. Eighteen feet between them?

A. Yes.

Q. Now, in these sections or in those stopes where you made your observation, as I understand you to the south you were unable to identify any Rainbow lode band, were you not?

A. In that stope?

Q. Yes.

A. No, I didn't say that. I said immediately at the point where I saw that vein in the roof.

Q. Where you saw the vein in the roof you are unable to identify any Rainbow banding or that any banding of the Rainbow lode has been cut or intersected in any way by that strand of the Jersey Blue?

A. I really recollect none. I want to say however in making that statement—qualify it—by saying that in the north side of the stope the banding of the Rainbow dipping to the north is very clear and at the point where I made the observation I did not notice any. Presumably it was not there.

Q. And you concluded that that strand of the Rainbow vein was cutting the Rainbow vein, due to its position, in the stope, isn't that right?

A. Not entirely, no, because the general trend of the banding of the Rainbow in the other portions of the stope is in a north-
1632 erly direction and it is practically certain that there is no change in the structure in between. That is a portion of the Rainbow structure.

Q. That is not what I intended by my question. You concluded that what—that where—that what you saw there, six inches of zinc with gouge and twelve inches in another place in the set, with gouge, was the Jersey Blue vein because of its position in the stope?

A. Partly only.

Q. What other observations did you make or have you made that led you to conclude that that was but a strand of the Jersey Blue vein?

A. Because the Rainbow ore is shattered alongside of the gouge here at the points where I observed it in the west edge of the stope; it appeared to be partly recemented by later mineralization.

Q. That streak or occurrence of ore that you saw there six or eight inches and twelve inches was clear out of the position of what from your former observations had been the true position of the Jersey Blue, was it not?

A. No, sir.

Q. Where else, anywhere in the workings of either of the mines have you been able to identify the Jersey Blue vein in the relative position of what you call this southerly strand of the Jersey Blue?

A. Well, I would have to look up my notes there; I am not sure of it. At this immediate point, vertically over or under, I
1633 would have to look at my notes and find out.

Q. Anywhere in the mine?

A. What do you mean exactly by "In this same relative position"?

Q. What I want to know is where else on any level of this mine you have been able to identify as the Jersey Blue vein anything that will correlate with *with* the south strand of what you term the Jersey Blue vein?

A. Well, you mean correlate in dip or on strike?

Q. Correlate on dip or strike or position, any way you want?

A. Well, there is in the far western end of the 1400 foot level, where it was observable in the face of the stope when I was in there, a gouge vertical in position that would correlate very well with this vein running through here.

Q. Well, that gouge on the 1400 foot level, was it on the north boundary of the Jersey Blue vein; didn't it constitute the north wall?

A. Not as I observved it; it is right in the ore at the end of the 1400 foot level, south.

Q. Was that a strand, or was that the entire Jersey Blue vein at that point?

A. I don't know. It was a strand anyway; I did not see all of it. Possibly there were other strands, but I did not see others.

1634 Q. What makes you think there might be other strands of this vein.

A. Only because that is not an uncommon feature.

Q. Doctor, do you recall on the second floor of the 1300 level, running easterly from the Clark raise, a drift along the north wall of the Jersey Blue vein?

A. I do.

Q. That drift is run on what you term the northerly strand of the vein?

A. I didn't say that—the northerly strand of what?

Q. The Jersey Blue?

A. No, that is not run on a northerly strand of the Jersey Blue. There is in that drift, I believe, at the west end, what appears to be a strand of the Jersey Blue and probably is; but the one that I observed in the foot of the raise would strike so as to carry it outside or south of that drift.

Q. I don't care about that; the northerly side of the drift driven to the east is up against the northerly boundary of the Jersey Blue vein, is it not?

A. No, sir, it is not.

Q. What is it up against?

A. It follows a gouge which I believe is probably on the north side of the Rainbow lode.

Q. The gouge that you follow in this drift in your judgment is the gouge on the northerly side of the Rainbow lode?

1635 A. From a point about—oh, roughly 15 feet from the east side of the Clark raise in that drift—I should say that the north side of the drift follows a gouge which is a gouge on the north side of the Rainbow lode; and there appears to be a strand—there is a strand, I think, of the Jersey Blue coming into the drift at an angle there, and lying on the south side of that gouge.

Q. This drift driven along that northerly boundary is driven into the open stope, is it not?

A. Into the open stopes?

Q. Yes, continuing easterly along that drift you come into that stope?

A. You come into that stope, yes.

Q. Where in that open stope do you find the north strand of the Jersey Blue vein?

A. I don't believe you find it in there; I don't see it?

Q. Why not?

A. Because I think probably it has narrowed down to such a small streak, just as this specimen W-3 shows, and has been refreshed by mineralization, that it is unidentifiable.

Q. Yet that northerly strand that in your judgment has dwindled down and faded out into nothing is the same strand upon which this raise has been driven from the highest to the lowest level of the mine, isn't it?

A. I didn't say that; it is one of them. There may be other strands in there.

1636 Q. The strand through which the raise passes is the strand which in your opinion, as you told me a little while ago—upon which the Clark shaft had been driven from the highest to the lowest level, isn't that true?

A. Will you kindly read that statement that I made there. I said that I conceded that the Jersey Blue went up in that shaft, although my observations were not very good; but I did not say that it was this particular strand.

Q. Well, identify any other strand upon which that raise was driven?

A. I did not—I don't know what may be in there.

Q. And your opinion is, in all candor, that the Clark raise was driven upon the Jersey Blue vein as disclosed at the bottom of that raise, from top to bottom, isn't it?

A. I don't know just exactly how much Jersey Blue there may be at the bottom of the raise. As I said before, the strand that I saw

Goss at the top was the only one that I could identify with certainty, because at the very bottom of the mine I did not see any ore at all.

Q. All right, take it at the top of the mine at that level. Now, you observed it, and it is your opinion that the vein as it passes upward is driven on that strand of the Jersey Blue vein, is it not?

A. It is driven on the Jersey Blue. That strand that I saw at the bottom may not be all of the Jersey Blue.

Q. But the Jersey Blue, as far as you are able to identify it, and along which in its upward course the Clark mine has been driven, so that Jersey Blue proceeds out into this stope in your opinion it fades out into nothingness?

A. I did not say that. I said that that particular strand which I observed at the foot of the raise very likely pinch out and is thence going toward the southeast, and an overlapping strand takes up some of the material of the Jersey Blue, or is a portion of the vein.

Q. Do you think, Doctor, that it is possible for that south strand to likewise pinch out and disappear?

A. I don't think that the evidence is that the Jersey Blue will pinch out as you go along the strike; it may be that one will dwindle out, and another one take it up, and another one take it up a little further along. I don't think there is any chance for the whole thing to pinch out, because we have observed it in both directions along in the strike.

Q. When were you last in this section of the mine?

A. On Saturday of last week; Saturday morning and Saturday afternoon.

Q. And you did not observe any evidence of any pinching out of that south Jersey Blue strand?

A. I was over in the stope. I could not see the eastward continuation here, because there is a large block of ore which has caved down and obscures all vision in that direction, and I did not follow it out in the stope in this direction or attempt to do so. I could not do everything in one day.

Q. Now, one or two questions on this section of yours?

A. Yes.

Q. As I understand your testimony, the plane of the section is normal at right angles to the strike of those segments of the Jersey Blue vein?

A. As nearly at right angles as I can get it, to a vein which varies a little in strike from level to level.

Q. At what angle did the plane of section cut the southeast segment of what you term the Jersey Blue vein at the tunnel level?

A. Approximately 78 degrees.

Q. So it was 12 degrees from a right angle?

A. Was, as I said, I could not get it exactly at right angles.

Q. Do you recall the angle at which Dr. Emmons's section up passed through that vein at that level; if you don't I won't bother about it?

A. Well, I should say it was approximately 40 to 45 or 50 degrees, maybe more than that here at this point, because there is a little

divergence in the strike of the vein. Somewhere between 40 and 50 degrees.

Somewhere between 40 and 50 degrees. I should like to say, however, that that particular level, the strike is such that the motion which I made does not cut it quite at a right angle; but as nearly as I can get it. I cut them all across the strike at right angles to get it.

Q. In other words, you could have 180 different dips, dependent upon the angle or plane through which the motion was passed, could you not?

A. I have got to think before I can answer that question.

Q. You pass a plane through a given point, you can go through a vein, you can change the position of the plane clear around from degree to degree, and you get a different dip at every change in the plane, can you not?

A. That is if you pass a motion through an inclined vein?

Q. Yes.

A. With every change in degree of the motion cutting it, you get a change in dip, but not 180 different directions.

Q. Ninety different directions?

A. Quite so, yes, sir—that is ninety different directions of the dip as traced on the plane of motion. You wouldn't get quite ninety either, because the last one would be parallel.

Q. Eighty-nine?

A. Eighty-nine and however many there may be in between each degree.

Mr. Dickson: Doctor, have you ascertained in what direction and how far from the bottom of the Black Rock or Clark vein at the 1300 level your section 9 was passed?

A. Yes, I could give that. Do you want the distance from which end of the vein, Judge?

Q. The plane of section passes out of the chute or the vein, does it, section 9?

A. Section 9 passes out of the vein.

Q. How far out to the easterly side of the vein?

A. I think over thirty feet from the east side of the vein.

Witness excused.

Testimony of Fred Searls, Jr., Recalled, for Plaintiff.

Fred Searls, Jr., recalled in rebuttal, testified as follows:

Direct examination.

By Mr. Gray:

Q. Mr. Searls, you heard the testimony of Mr. Starck and some of the other witnesses, in which they have given it as their opinion that the Black Rock fault runs as claimed by the defendant, and shown upon their maps, and that a branch of it extends northwesterly striking along the Jersey Blue vein, and that another small branch

of it extends at least in one place southeasterly. In that connection he gave it as his opinion that the faulting was contemporaneous.

Taking into consideration that and also the testimony of
1641 Dr. Emmons, that there was some horizontal movement along this Black Rock fault, is it mathematically possible that that fault could have coursed along the Rainbow lode, and at the same time a branch of it have coursed along the Jersey Blue lode, as claimed by these witnesses? And in that connection if you have prepared any models to show the mechanical impossibility of the theory of the gentlemen upon the other side, please present same.

Mr. Kremer: Now, if your honor pleases, we desire to object to that upon the ground that it is not rebuttal. If we are going to be permitted to answer upon sur-rebuttal we would have no objection to this, but this seems to me to be prolonging this matter indefinitely. They have testified that this fault was along their so-called Jersey Blue and Black Rock and we have answered their contention.

Mr. Gray: By stating another theory, that it was a strike fault.

Mr. Kremer: Certainly.

The Court: They stated the existence of certain phenomena in the ground and gave their reasons for it and you came on and stated what you saw in the ground and opposed their reasons and gave new reasons. Now, they have a right to meet your new reasons in rebuttal.

Mr. Kremer: All that I desire is to have the privilege of meeting this illustration.

The Court: If they should bring out anything new that
1642 would warrant an answer from you, you certainly would be permitted to meet it on sur-rebuttal.

Mr. Kremer: We have no objection to their illustrating anything then if we have an opportunity to meet it.

The Court: Proceed—that is if there was an objection, it is overruled.

Mr. Kremer: No objection. I merely wanted it understood.

The Court: Very well.

A. I did not hear all the testimony to which you refer, Mr. Gray, but I was present in the court room enough to ascertain that the fault was supposed to branch in the manner in which you indicated, and I think it is rather obvious that a fault which is a strike slip fault that is upon which the motion is largely in the direction of the strike of the fault, cannot branch in such a manner that the line of junction of the two branches is approximately down the dip of the fault. I have here three little blocks—or one block cut into three pieces. The block of wood which I hold in my hand is cut in three pieces which are labeled block "A," block "B" and block "C." The two blue lines drawn upon these blocks represent in a diagram-atic way the course of the Black Rock fault and of the post-mineral fault which is supposed, I believe by the testimony referred to, to exist along the hanging wall of the Jersey Blue vein. If a fault branches in the manner shown by these blue lines mentioned and that

1643 fault being contemporaneous, that motion can only take place in a direction parallel with the line of junction of the two branches of the fault for this reason, that in the first place it can take place in that direction because the motion on the portion of the fault which represents the two branches joined must be the vector sum of the motion of the two branches.

The Court: Must be what?

A. Must be the vector sum; that it must be a displacement equal in amount and in direction to the sum of the component of motion on the two branches of the fault in the same direction. That can take place only when the blocks are moved in the direction which I now indicate.

Mr. Gray: That is vertically upward?

A. Vertically upward or downward. When the line of junction of the two branches of a fault is vertical it can be moved in the direction in which I now hold the blocks and it is perfectly obvious that the amount of displacement along that portion of the fault represented by the wider blue line, where the two branches are joined is equal in amount to the sum of the displacement on that portion of the fault between block "A" and block "B" plus the motion on that portion between block "B" and block "C." If, however——

Q. Mr. Searls, that would be a fault?

A. That would be a dip slip fault, technically known as a dip slip fault; that is to say a fault in which the direction of motion coincides with the dip. If, however, motion along both of
1644 the branches of this fault takes place at the same time in a horizontal direction, it can take place in one of two directions, either towards me as I now hold the blocks or away from me. If motion takes place towards me the motion on the part of the fault where the two branches are shown must, as before, equal the vector sum of the motion on the two branches; that is to say it must equal the amount of displacement now indicated on the farther side, plus the amount of displacement which has taken place along the branch of the fault between block "A" and block "B" projected into the line of the main branch of the fault; and that would necessarily cause a tearing apart or rending and separation of the blocks, block "B" and block "C," precisely as I now hold it.

The Court: Block "A" and block "B"?

A. Block "A" and block "B," yes. If the motion——

Mr. Gray: Just a moment, so we can get it into the record clearly: in other words, there must be what you call the vector sum between block "A" and block "C," because the point of junction must be equal to the displacement between blocks "A" and "B" and "B" and "C"?

A. Yes, sir, that is a correct statement. If the motion were assumed to take place in the other direction parallel to the strike of the fault, the motion as before between blocks "A" and "C" must equal the sum of the motion between block "A" and block "B" and between block "B" and block "C" as mentioned.

1645 Mr. Dickson: What do you mean by the motion?

A. The amount of displacement.

Mr. Dickson: The amount of displacement?

A. Yes, sir, the displacement between block "C" and block "B" being indicated in the position which I now hold these two blocks, and the displacement having occurred also betwe-n block "B" and block "A," the displacement between block "C" and block "A" must equal the sum of these two, so that the displacement between block "C" and block "A" would, as before, make a tearing apart of the whole country by the wedge of block "B." If such a thing occurred in this mine subsequent to the deposition of the Rainbow lode, the entire vein would be brecciated and ground to powder in a way in which we find no observation in the mine. So I think it is obvious the only direction a fault branching as that branches could move would be in a direction parallel with line of junction of the two branches of the fault. I would like to say that I think there is a little sophistry in that explanation introduced by the assumption that the two faults moved a- exactly the same time, because that is not the way that faults move, as we know now; motion along faults never take place in a gradual way, with a very slightly increasing motion, but it takes place by jerks, by a gradual accumulation of stress in the rocks until the elastic limit is reached and a rupture is produced. But certainly a branching Black Rock fault with
1646 branches running off to the northwest and southeast presents such mechanical impossibilities that it is impossible to conceive of it.

Q. But threw it over as you have last described it?

A. Yes, sir.

Q. Mr. Searls, did you take any of these specimens that were presented to Professor Salisbury in his examination, from the mill tunnel?

A. Yes, sir.

Q. Have you prepared a map showing the exact location from which you took such samples?

A. I have prepared such a map.

Q. And it is upon what scale?

A. It is upon a scale of five feet to the inch.

Q. Will you just produce that map?

(Witness produces map.)

Mr. Gray: These were marked 1X to 6X were they?

A. Yes, sir.

Mr. Gray: Will you *make* those blocks as exhibits and also the map?

The blocks of wood were marked Plaintiff's Exhibits 134, 135, and 136; and the map admitted in evidence and marked Plaintiff's Exhibit 137.

Mr. Gray: Mr. Searls, plaintiff's exhibit 137 was prepared by you?

A. Yes.

1647 Q. Just go ahead and explain it?

A. Plaintiff's exhibit 137 is a detailed sketch of a portion of the mill tunnel on a scale of five feet to the inch. Surveyors went into the tunnel under my direction and sketched on the map accurately the position of every timber and the exact shape of the walls of the tunnel and other points included within this sketch. Subsequently I went in the tunnel with this sketch, took it underground, and mapped thereon every slip and fault and exposure of gouge and of quartz and of altered granite that occurs in the limits of these workings so that the map as here presented shows all the quartz and all of the vein material which is exposed in these workings.

Mr. Dickson: What is the purpose of that, may I inquire?

Mr. Gray: To indicate the places where he took the samples and to show the direction of the little slips that are in there on such scale——

Mr. Dickson: Is it introduced to combat the claim of the defendant, that they have crossed the east end line of the Black Rock claim?

Mr. Gray: Well, it is introduced simply to elucidate the facts as they actually exist there in connection with the——

Mr. Dickson: I wish you would kindly answer my question. Is that one of the purposes, to show that the vein does not cross the east end line of the Black Rock claim?

1648 Mr. Gray: I think that it does tend to do that, Mr. Dickson.

Mr. Dickson: Any evidence offered for the purpose of showing now that the vein does not cross the east end line of the Black Rock is clearly not rebuttal because I have read carefully the testimony of Mr. Winchell in chief and of Mr. Greene and of one other witness, which one the name I do not recall now—I think it was Professor Irving—in which they went into the question and each expressed a positive opinion that the vein did not cross the east end line of the claim. This is certainly not rebuttal.

Mr. Gray: The question of its crossing there is purely a matter of defense.

Mr. Dickson: But you went into it in chief and claimed our vein is located upon the crossing of the side line. If your honor pleases, there is an affirmative answer in here and we claim extra-lateral rights between the end lines of the Black Rock, that shaft that Mr. Winchell said that their claim was located upon a vein which crossed the side lines and went further and said there was no vein crossing the east end line of the Black Rock, and so did Mr. Greene, and I am quite sure Professor Irving was the third; three of them went into that.

The Court: Of course you had to go farther than to meet their evidence; you had to establish it as a fact, if any of your rights depend on that crossing. I suppose you all recognize that
1649 evidence may be admissible in rebuttal that also would have been admissible in chief. It is true that they went into it in their direct, in their case in chief, and perhaps they need not have,

but I think they have a right to introduce it now, at least to the extent of showing assays in opposition to the assays which you people showed. I think to that extent at least it would be admissible.

Mr. Gray: This, of course, goes a little further than that. This is a new working—that I think will be conceded—that this branch southeasterly is a new working, and it is a more easterly description of the conditions that exist there, to meet this question.

Mr. Dickson: When was that work done and by whom?

Mr. Gray: It was done by you. I don't know just when but your own witness, Mr. Finch, stated it had not been surveyed and it was not placed upon your maps.

The Court: Insofar as it is proper rebuttal it will be admitted. The objection will be overruled to that extent. Insofar as it is not, unless it is new workings that have been done since your case in chief was put in or since you had an opportunity to inspect it, of course the court would disregard it.

Mr. Gray: Proceed, and state first how—or indicate the various points—represented by these samples.

The Court: If there is anything new in these samples that the defendant- desires to meet in sur-rebuttal they will have an opportunity to do so.

1650 A. As I stated, I have located accurately upon this map all of the quartz vein material and altered granite which occurs within these workings; the gouges and slips and fault material are shown in blue lines; the quartz is shown in red lines; the altered granite is shown by the green legend of cross marks; the fresh granite, unaltered granite, granite which has not been affected by vein alteration, is shown by the same legend of blue marks, blue or purple.

The samples which were shown, I believe, to Mr. Salisbury were taken by me from the positions that I have noted on this map. 1-X is located in the cross cut, taken from the granite there exposed in the wall at the point at which I now hold my finder, where the words "Sample 1-X" are written. Sample 2-X is taken from the point about 12 feet further along in the cross cut in the middle of the so called vein. Neither of these samples show- any alteration of the granite by the vein forming solutions or by any sort of vein action; they are slightly altered, due to their proximity to the surface, but they are the ordinary type of granite that can be found in the road cuts and railroad cuts anywhere in this town. Sample 3-X which I hold in my hand was taken from where the words "Sample 3-X" occur on the map; and Sample 4-X was taken further along in the diagonal cross cut at the point where those words occur. The sample 3-X has a slight discoloration or black stain on it, but it is not such granite as occurs in the veins in this district
1651 in any sense of the word. Sample 4-X is similar granite, a little more altered by surface action, but not at all acted upon by the vein. Sample 5-X was taken in the drift a little further

along than the drift is shown to extend upon this map. I will say that this drift——

Q. That is the southeast drift?

A. The more southerly drift on which I now place the words "New drift." It has now been run across, connecting with the cross cuts and extended in a southeasterly direction in the last two or three days, or anyway, subsequent to the making of this map. They are still working there, I believe. It was done since this survey, and I have not shown the drift. Sample 6-X was taken from the north cross cut about 40 feet beyond the limits of this map. It is more altered than any of the samples taken from the middle part of the so called vein, and I think the alteration is due to the fact that the hill is sloping toward the mouth of that cross cut, and the granite is somewhat closer to the surface. I would say that in taking these sample- I endeavored to get average samples of the granite as it is exposed in those workings, not taking the harder or more indurated material. There is plenty of granite there like this sample, 6-Y, which I now hold in my hand, which was taken from this new drift at a point where the words "Sample 6-Y" occur; that is such granite as is used in paving stones in this city.

Q. It is rather fresh granite then?

A. Very fresh and hard, yes.

1652 Mr. Dickson: We have made no reference to that drift at all.

The Court: I don't think the defendant has shown anything with respect to that new working.

Mr. Gray: Mr. Finch testified that they were driving there, and that it followed one of these veins or slips.

Mr. Dickson: He said he had been into it only a few feet.

The Court: Well, of course if there is any new work, the court does not wish to intimate that it should not be brought out by one side or the other if it shows anything material.

Q. Extending from station to station there is a straight red line running through there; does that represent anything other than the survey?

A. No; that is the transit line.

Q. Outside of that, have you shown everything in the way of fault gouge or vein material that is disclosed in those workings?

A. I have as far as those workings are shown on this map, and as I before stated, the south drift has since been extended, and there is exposed in that, exposures of quartz and gouge which are entirely comparable to what is shown in the portion of the new drift which is shown on this map. The gouge which occurs in this new drift extends across the cross cut and throughout the length as
1653 shown on this map, and on out and a considerable distance beyond the end of the severed vein.

Q. Have you anything else to say about it?

A. No, excepting that the shape of the working as surveyed shows the tendency of the working to follow these two northwest fault veins

which occur there, and which are perfectly definite little veins, and which may be traced in those workings.

Q. Running northwesterly and southeasterly?

A. Running northwesterly and southeasterly.

Q. Now, Mr. Searls, did you get from the Deadwood vein, so called, this Deadwood fault fissure, any of the gouge which was typical of the gouge of that vein?

A. Yes, I took some gouge from the second floor of the stope in
1019 drift of the Deadwood vein.

Q. Will you present that sample?

A. That gouge is represented by the two samples marked F-X and G-X which I now hold in my hand. Sample E-X was taken from the Jersey Blue vein from the hanging wall gouge on the thousand foot level, the same level as that from which the Deadwood gouge and samples were taken.

The Court: What are they offered for?

Mr. Gray: To show that there is no difference in the gouges as to containing pebbles.

The Court: Well, ask the witness a question about it, and show it in some way?

Q. Just state whether there is any difference in the gouges,
1654 from the Deadwood and the gouge from the Jersey Blue with reference to their containing pebbles and fragments of the vein?

A. The specimens of the gouge from the Deadwood vein and that from the Jersey Blue vein and all of those from the other fault veins which I have seen — to identify all show fragments of the different minerals which are contained in the veins along which these gouges course. They all contain rounded dragged fragments of the vein matter, dragged in by a little subsequent motion, after the vein had been formed. That subsequent motion along a fissure is something which is common to all fissure veins as far as I know.

Q. And these gouges all contain pebbles?

A. Yes, all of them.

Q. Where else did you get gouges to indicate that the gouges of the fault fissures, the northwest fissure, have pebbles of ore and quartz and vein material in them?

A. Gouge sample G-X was taken from the 2400 foot level of the High Ore Mine, and represents an exposure of what is there stated to be the Edith May vein, which shows fragments of quartz and copper ore dragged into the gouge.

Q. The Edith May is one of the northwest fissures?

A. It is one of the well known northwest fissures of this camp, I believe. Sample C-X is from the same place, from the High Ore.

Q. Did you get one from the Jessie?

1655 A. No; Mr. Greene got that.

Q. Is there any work that is not shown upon this Exhibit 137, on this level?

A. Yes.

Q. Any new work?

A. The cross cut which extends to the north edge of the map——

Mr. Dickson: You had better show it on some other map.

A. It is shown on Exhibit 66. This cross cut containing station 3 and extending to the north edge of Plaintiff's Exhibit 137, and also shown on Defendant's Exhibit 66, running northwesterly from station 111-B, has been extended in a new north direction across the side line of the Black Rock claim. In the very mouth of that cross cut, where it goes out to daylight, there is a rather abundant exposure of quartz. More quartz is exposed there than occurs in any of these workings shown on plaintiff's exhibit 137.

Q. Now, Mr. Searls, did you examine the new work at the top of the Pyle raise in the south cross cut?

A. Yes, sir.

Q. Could you indicate to the court just where that is driven and what is disclosed there?

A. Pointing to the top of the Pyle raise above the 506 cross cut on the skeleton model, plaintiff's exhibit 46, there has been extended from that a short cross cut to the south. The cross cut is 18 feet long. It runs through solid granite, except that at a point 10
1656 feet from the raise there is a little minute vein with a southerly dip going down across the cross cut. The vein contains one-eighth of an inch of blue gouge, and four inches of quartz, and a litle bit of pyrite and zinc blende. That may be seen across the entire cross cut.

Q. Its dip is in what direction?

A. Its dip is to the south at about an angle of 78 degrees.

Q. Now, Mr. Searls, have you visited the 1300 foot level of the Black Rock?

A. Yes, sir.

Q. When did you make that examination?

A. I went down there on Sunday night last.

Q. Had you ever been in the raise that has been referred to here as the Clark raise from the 1200 up to the 1000, prior to being on the stand before?

A. I never had; I did not know that the raise existed until it was referred to here in court.

Q. Will you now simply state what is disclosed in there, what you observed on the 1300 Black Rock level with reference to the exposure of the Jersey Blue?

A. I went into this Clark or wet raise on the 1200 foot level of the Black Rock, and climbed down to the 1300 foot level. The raise throughout that 100 feet follows the Jersey Blue vein. I could not be positive, however, that it follows all of the Jersey Blue vein for all of that distance. At a point just below the two little cross cuts which run, one north and one south, shown in that raise on either of the skeleton models, there is a rather weak place in the
1657 vein, as you can see between the timbers of the raise; it is only about two and a half or three feet wide. However, I

am very certain that that vein is followed continuously in that raise from the 1200 down to the bottom.

Q. Those two cross cuts are between the 1300 and the 1200?

A. Yes, and the exposure of the Jersey Blue vein in the bottom of that raise is just as plain as it is anywhere else in the raise. The south wall of the vein is on the south side of the raise, and as you stand in the raise and look at the south wall of the Jersey Blue vein, the Rainbow structure in the stope above the sill floor can be seen very plainly. It is just as plain as the structure in the specimen of ore, S-2, where the alternate zinc and quartzite bands can be plainly seen, and this structure dips 55 degrees to the north, and across that structure and cutting it and breaking it down, is a plain wall, the south wall—at least of that portion of the Jersey Blue vein. There is nothing obscure about it, and nothing that is hard to see. The structure comes in at an angle of 55 degrees, and is cut off by a wall which dips vertically, and the polishing of the previously existing ore and the slickensiding, with the striations which rake to the east at an angle of 15 degrees with the strike are plainly observable on the south wall of that raise. That wall strikes north 77 degrees west. It is marked by a thin gouge. Next to the gouge and plainly discernable across the severed strands of ore is ten inches of
1658 rather white quartz, parallel with the gouge, dipping vertically and lying right against the north dipping structure of the Rainbow lode. Crossing the raise to the north is the structure—I mean discernable across the full width of the raise to the north is the vertical structure of the Jersey Blue; zinc and quartz banded vertically. As you hold your pick up against them, you can see that they are absolutely vertical, and the raise on its west wall exposes for the width of the raise the Jersey Blue vein, and the south wall of it across the Rainbow structure at the south edge of the raise. Going up one set in that raise you can get into a little drift driven recently from the third floor of the stopes, connecting with that raise. The drift goes east from the raise; it was driven westward from the stope to the raise. This little drift is shown on plaintiff's exhibit 133 under the words, "New drift" which I now place upon that exhibit. Entering the drift from the raise, the Jersey Blue vein, which has been followed down in that raise, can be seen in the corner of the drift, and as you go to the east along that drift, which there follows the hanging wall of the Rainbow lode, the Jersey Blue vein, with a width of at least six feet, may be seen diverging and going out of the drift and into the Rainbow lode with a strike of about north 60 to 65 degrees west, and the angle between the hanging wall of the Jersey Blue and the hanging wall of the Rainbow lode can be seen very clearly indeed in the roof of that drift. As you
1659 hold a 30 degree triangle and sight one of the two gouges in the drift, one of them coincides with one leg of the triangle and the other coincides with the other, and it is perfectly obvious from the appearance of that drift, that it does not follow the vein which is exposed in the raise, but that the vein exposed in the raise departs from the drift in a southeasterly direction. The point at which the gouge of the hanging wall of the Rainbow lode and the

gouge of the hanging wall of the Jersey Blue are together is about six feet from the timbers of the raise, and in that six feet it is impossible to see that the one gouge runs through the other; they are apparently merged in that six feet; it looks as though those two gouges are together for that distance, but as you go up the Clark raise you can see that the Jersey Blue vein goes up with a vertical gouge, so that the intersection of the two gouges on dip is plain there, although for that distance of six feet they do appear to be merged on their strike. So that in that exposure in the corner of the drift and in the raise we have the south wall of the Jersey Blue on the south side cutting across the Rainbow lode, and the north wall of the Jersey Blue on the north side cutting across the Rainbow lode, and both of them are just as plain as that same wall of the court room. Going out of this drift and around into the stope, at a point six sets from the north side of the stope is a wall which strikes north 73 west, and dips 80 degrees to the south. That is not a little mud
1660 slip or an insignificant gouge; it is a very strong structural feature in that vein, which can be traced across the floor and up over the sill floor above, and when the new drift was started the blasting there shook down great chunks of the vein material from that vein. It was the cutting of the Rainbow lode and the brecciation of it by that vein which disturbed it so much that the whole country in there is loose, and they have had to timber it up and crib it up above the sets. That drift has been driven in an easterly direction along that plain vein in the edge of the stope.

Q. You mean in a westerly direction?

A. Yes, in a westerly direction. That drift at the time I saw it was about eight feet long, the little drift driven almost due west from the westerly edge of the stope along that vein. It is obvious, not only from that drift, but also from the exposures which one can now see in the top of the sill floor below, that that wall is not the same wall structurally as the south wall of the Jersey Blue vein, which can be plainly seen cutting the Rainbow lode at the south edge of the raise. There is an overlapping there; those two do not join; the strike of the one in the edge of the stope is not sufficiently to the north of west to join with the other one which is seen in the south edge of the raise; but going southerly from the bottom of the raise along that sill, there is no structural feature, no vein commensurate with that in the edge of the stope to be seen in the back of the sill, and it is very plain to me that the Jersey Blue vein, as shown in the bottom of the raise, follows across and coincides with that
1661 exposure as shown in the edge of the stope, and that that wall sticks out beyond the point where the Jersey Blue vein comes in, so that there is a sympathetic fracture there, and another wall nearly parallel with the Jersey Blue, cutting across the Rainbow lode, and there is a little horse of the Rainbow lode between those two little branches, or between the little branch and the main Jersey Blue, just as there is often a horse of granite enclosed in the vein. The older Rainbow lode is the country rock there for the Jersey Blue, and we have there a phenomenon which is common when veins cross from one sort of country rock into another sort of country rock;

the structural features of the vein do not at all persist. I think we are all familiar with veins crossing from quartzite into limestone, where the character of the vein and the extent, particularly, of the shattering of the country rock, shows marked changes in the two different country rocks that the vein is traversing; and in the crossing of the Jersey Blue through the Rainbow lode in that section, we have just such a phenomenon. I have not seen, and you cannot see in any 1304 sill or in any portion of the stope, the Jersey Blue vein cutting all the way across the Rainbow lode, but I can see it cutting in on the hanging wall side of the Rainbow lode and cutting across the structure, and I can see it cutting the structure in the middle of the lode, and going down three floors below the 1300 sill, or four floors below, on the 9th floor of the 1400 stope, I can see that
1662 same vein departing from the foot wall and cutting across the structure there as shown in the sketch, plaintiff's Exhibit 48. This point is nearly under the point 263, where the Jersey Blue vein, with a strong blue gouge and parallel zinc banding, may be seen cutting the foot wall of the Rainbow lode as exposed in the 9th floor of that stope, and traversing it in diagonal fashion. So that you have a vertical range of 56 feet, within which I have seen the Jersey Blue cutting in on the hanging wall, cutting across the Rainbow lode and departing from it in the foot, to the south.

Q. Is there anything else you want to say about that?

A. That is all.

Q. At the time that you were on the stand before, where had you seen the Jersey Blue, if at all, upon the 1300 foot level of the Black Rock?

A. I had not seen it at all on the 1300 Black Rock.

By the Court: Why not?

A. The sill had been always lagged closely, and it is impossible to make these observations on the sill floor. However, in the stopes, and immediately adjacent to the positions now discussed, I have seen the Jersey Blue vein crossing, on the second and third floors on to the east of the point where I can now see it, and the projection there onto the sill floor is correct.

By Mr. Gray: And you did not know of this raise?

1663 A. I did not know of that raise; but it is perfectly plain now what happened there, and I do not think that the miners showed any uncanny knowledge when they were called to go in there and start to drill on the Jersey Blue vein to connect with a point 100 feet above them. They had the point in the bottom, and they had the vein in the top, and they just went through there.

Q. You spoke of this drift being on the 3rd floor; is it the 3rd or the 2nd floor; how do you number your floors?

A. Well, the bottom of the drift is 17 feet above the floor of the sill; I call that the third floor.

Cross-examination.

By Mr. Dickson:

Q. The miner, you say, did not display or manifest any uncanny knowledge when he started to make the raise from the 1300 up to the 1200?

A. No; the vein was well exposed at both points.

Q. The layman, if he knew that he had been following that Jersey Blue vein from practically at the surface down to the 1200 in the Black Rock raise in an almost perpendicular course for 1200 feet, would not display any uncanny knowledge if he wanted to make a connection from the 1300 up, and if he started at that place?

A. And particularly if the vein were well exposed there.

Q. Well, if it were not exposed there, knowing that you had a vertical raise some 1200 feet in height from the surface down to the 1200, almost vertical all the way, and you wanted to start a raise from the 1300 to connect with that same raise at the 1200, the surveyor would give you a point vertically beneath, and you would start there and go up, wouldn't you, regardless of any vein?

A. If the surveyor gave you such a point, yes.

Q. What do you call a dip fault, a fault upon which the displacement has been vertical, or the downward course of which is vertical?

A. If I used the term dip fault, I used it inadvertently; I mean to use the term "dip slip fault."

Q. You mean a fault on which the displacement has been vertical?

A. No; I mean a fault on which the displacement has been parallel with the dip of the fault.

Q. It is not infrequent to find in fissures a faulting on their strike, is it?

A. It is not very infrequent, no, sir.

Q. It is quite a common observance?

A. Yes.

Q. If you had a vertical fissure which did fault on its strike, would there be anything impossible that such a fissure, where it did fault, traversed, one branch from the faulting along the Jersey Blue vein, and the other along the Rainbow lode, if this was a vertical fault?

A. It would be perfectly possible for such a fissure to form as a crack, if there were no motion on it.

1065 Q. Well, one of the witnesses has said that there was no perceptible motion on this fault; one of the witnesses for the plaintiff.

Mr. Gray: Which fault?

Mr. Dickson: The Black Rock fault. Mr. Greene so testified. I can give you a reference to it.

A. I disagree with that reference.

Q. But at all events, I suppose you are not familiar with and cannot undertake to explain all the vagaries and aberrations of motion?

A. That is certainly true, Judge.
Q. What is it?
A. That is certainly true.
Q. Now, could we not have a vertical fault fissure or a vertical fissure—have we the word "fault" for the present—which might so happen that one branch would traverse the Jersey Blue vein, as you call it, and the other traverse the Hamilton belt as you call it?
A. Portions of them [illegible] are vertical.
Q. I am not talking about the veins. I am speaking about a vertical fissure which [illegible] could it not so [illegible] that one branch of it would traverse the Jersey Blue vein just as the defendant claims and the other traverse the Hamilton belt, as we practically agree it does?
A. Well, I don't think that either the Jersey Blue or the Black Rock are strictly vertical.
Q. I am speaking of a fissure—assuming, as you will [illegible] understand what I mean—I have to admit the Black Rock fault.
A. Yes, sir.
Q. Assuming that was a vertical fissure, the Black Rock fault, it might fork as it comes to strike it, of course?
A. Yes, sir, under certain conditions.
Q. And couldn't one branch of it traverse the Jersey Blue belt [illegible] and the other branch of it go through the Hamilton belt?
A. It could if other facts were so and[illegible] upon it as if the junction were possible with the line of junction of the two [illegible]. Otherwise not.
Q. Can you refer to and just what the direction of movement was in the Black Rock fault?
A. I am not able to tell just what it was but I believe it had a considerably horizontal component.
Q. You believe so?
A. Yes, sir.
Q. You have not been able to determine it?
A. Only very roughly.
Q. Have you been able to determine satisfactorily what the direction of the movement has been on the Black Rock fissure?
A. No, sir.
Q. I think you would put up that for [illegible] way.
A. Yes, I do.
Q. You have not been, Mr. Smith, been able to determine satisfactorily either the direction or the extent of movement on the Black Rock fault?
A. No, sir.
Q. Isn't the Black Rock fault, taking it from top to bottom—I don't mean every foot of the way or every ten feet of the way, but practically—a vertical fault, vertical fissure rather?
A. I believe it is within the limits of [illegible] mine.
Q. That is what I am speaking of, within the limits of [illegible] mine.
A. Yes.

Q. Hand me two or three of the most altered X samples?

(Witness produces some samples.)

Q. In your remark "E" on plaintiff's exhibit 8 and in that part of the remark which you include as being within the boundaries of the Rainbow lode that is north of the south boundary of the lode, do you not include granite just like sample 8-X, or strikingly similar to it?

A. No, sir. I have in my other hand here a piece of granite from the extreme south end—near end of that remark, which I believe all the witnesses, particularly Mr. White, agreed shows no vein alteration whatsoever, and you see that the degree of alteration of these two rocks is very similar.

Mr. Gray: You are referring to 7-X now; how is it marked?

A. Marked 7-X.

Mr. Dickson: My question was, Mr. Smith, whether or not you did not include within the limits of the Rainbow lode, where you find it crossing the common boundary line between the Ella Orde and Black Rock, granite which shows no more evidence of vein influence or vein action upon it than is shown in sample 8-X?

A. I don't think so.

Q. Not quite positive?

A. Yes, I am quite positive.

Q. Where was your sample 9-Y; where was that taken from?

A. 9-Y?

Q. That was taken from where?

A. Taken from the north side of the—of a new drift at a point further to the southeast.

Q. And marked what?

A. Marked sample 9-Y.

Q. Do you not have granite within the boundaries of what you call the Rainbow lode just as unaltered as the sample 9-Y?

A. I certainly don't recall any such places, Judge.

Q. No stringers within the limits of what you claim to be the Rainbow lode in which you find granite unaltered, absolutely unaltered, and have? you so testified?

A. There might be unaltered granite between two strands of the Rainbow lode or something of that kind.

Q. Within the limits of your lode, within the boundaries, between the north and south boundaries of what you call the Rainbow lode, don't you have in many places very considerable areas of unaltered granite, and sometimes considerable?

A. If you specify in that question a position where the Rainbow lode is split and includes a horse of granite within two portions of the lode, I would agree with you, otherwise not.

Q. Well, you include within the limits of the lode such horses of unaltered granite do you not?

A. I think there is room for a difference of opinion about that. I personally would be inclined not to.

Q. Don't you include it within the limits of the lode?

A. No.

Q. Come to the map, exhibit 4. You have two strands represented here of the Rainbow lode, one running from the westerly end line of the Elm Orlu to and beyond co-ordinate line 1000?

A. Yes, sir.

Q. You have another strand continuous from the west end of the Elm Orlu to and beyond—or to co-ordinate line 900. The white, the uncolored matter between these strands you include in your lode, do you not?

A. It is included as a horse of granite between two stranda, but I don't call it a portion of the vein.

Q. It is within the boundaries of your lode?

A. Yes, that is true.

Q. And it is unaltered granite, is it not?

1670 A. It certainly is, yes, sir.

Q. And do you not have at places—I do not mean generally, but in places practically unaltered granite in close proximity to ore?

A. I think that is true practically in the lower levels of the mine.

Q. So that the mere fact that you find unaltered granite in very close proximity to ore in the Rainbow lode would be no indication to your mind that that unaltered granite was not within the boundaries of the lode, would it?

A. It might be between the north boundary and the south boundary of the lode, but I wouldn't consider it as part of the vein.

Q. But you would consider it a part of the Rainbow lode, would you not, even though it was not ore, if you were asked where the boundaries of your Rainbow lode were northerly and southerly, and you found granite, unaltered within close proximity to or between what you call the northern boundary and the southern boundary, you would still say that was within the limits of the lode?

A. I would say it was within the limits of the lode but I wouldn't say it was a part of the vein any more than a chair in a room is a part of the room.

Q. Do I understand you to say that somewhere in the crosscut running southerly from the mill tunnel, did you find any altered granite—such alteration being the result of vein action?

1671 A. Certainly not.

Q. Nowhere?

A. I say that I—I say that you did not so understand me.

Q. Then I will put it again: did you find nowhere in the crosscut running southerly from the mill tunnel altered granite, which alteration in your judgment is the result of vein action?

A. I did find that, yes, sir.

Q. Did you bring any specimens of that?

A. Not from that crosscut, no.

Q. Do any of your X samples which you have presented here show that?

A. No, sir.

Q. Why didn't you bring one of them?

A. I sought to show by these samples the character of the majority of the granite included in that.

Q. And you find in that crosscut altered granite which in your judgment was the result—the alteration—was the result of vein action and you studiously avoided presenting any such samples?

A. No, I didn't studiously avoid it.

Q. You didn't present any such?

A. I show it on this map.

Q. But you didn't present any such samples of such granite?

A. That is perfectly true.

Q. This being on a scale of five feet to the inch, exhibit 137, give me the distance from the south side of the mill tunnel to
1672 where we have southerly therefrom the first red streak shown upon this exhibit?

Mr. Gray: You mean from that, from this development?

Mr. Dickson: From the southerly side of the drift running easterly from that crosscut, how far south is it to where you come to the first red streak crossing the crosscut?

A. Nine feet.

Q. And what is that red streak intended to represent? Ore?

A. That represents quartz.

Q. Vein material?

A. Yes, sir.

Q. What is the width of it; have you your notes?

A. My notes are on this, Judge; I took these. The width of that is four inches on the west side of the crosscut and two inches on the east side.

Q. Any gouge on either side of it?

A. No, sir.

Q. What is the course of it?

A. North 76° west. I would say that these are not portrayed on here with a protractor, but put on in a more accurate way by measuring the distance from each timber.

Q. Have you given me the crosscut?

A. Yes, sir.

Q. Accurately?

A. Yes, sir.

1673 Mr. Gray: I have one question I would like to ask Mr. Searls.

Mr. Dickson: Very well.

Mr. Gray: Mr. Searls, were you in the stope which goes out from the easterly portion of this little drift, from the W. H. W. crosscut?

A. Yes, sir.

Q. On the Black Rock 300?

A. Yes, sir, I have been in that opening.

Q. How high up did that stope extend, as nearly as you can state from the sill floor of the drift there?

A. I was in that stope about eight or ten feet above the sill floor,

but I have a note in my book the stope went up fifty feet. I can't recall absolutely whether I could see up there fifty feet or not.

Q. It was some distance above you, however?

A. Yes, quite a ways.

Q. In that stope did the course of the vein as disclosed there change?

A. No.

Q. What was the course in the stope?

A. The course continues in the same direction where it is shown—where the vein is shown in the drift.

Q. That is northeasterly?

A. Southwesterly.

By Mr. Dickson: Continuing on exhibit 137 I wish you would scale the distance from the south side of the drift running westerly from the crosscut from the mill tunnel to the place where you
1674 have shown upon this exhibit two seams; I suppose they are, one of them red and the other in blue, almost in juxtaposition?

A. The distance from the south side of the drift to that vein is forty-two and a half feet.

Q. What is the red streak there intended to represent?

A. The red streak is quartz.

Q. How thick is it?

A. About eight inches.

Q. And the blue represents gouge?

A. Yes, sir.

Q. In contact with it?

A. Yes, sir.

Q. On the south side?

A. Yes, sir.

Q. Is the course of the gouge and quartz coincident?

A. Yes, sir.

Q. What is the course?

A. North 69 degrees west.

Q. What are these figures, 109 and so on?

A. Those are the transit station numbers.

Q. Just easterly of transit station number 1109, there is shown here a red streak, which is not a survey line, extending as I now indicate. What is that distance?

A. The distance that that stringer is observable is 45 feet.

Q. Is that a stringer of quartz?

1675 A. Yes, sir.

Q. Did you have the lagging removed in that drift?

A. The exposures in the roof were very good. There are a few lagging there, but not sufficient to obscure the view, and I might say that this is entirely a map of the roof of the drift. We did not project these to the floor; it is a map of the roof.

Q. Going to what you have marked on this exhibit 137 "New drift." When were you in there last?

A. I walked rapidly through there night before last.

Q. When did you make a detailed examination of it?

A. Nearly ten days ago, or, I should say—seven or eight days.

Q. Did you make a careful examination of that drift at any time?

A. I made a very careful examination of that portion of the drift which is portrayed on this map. The rest of the drift I have not made a detailed examination of.

Q. What is the length of the drift as portrayed on exhibit 137?

A. 72 feet.

Q. Of that portion you made a careful detailed examination?

A. I did, yes, sir.

Q. Where the drift starts off in a southeasterly direction,—I wish you would put some number there so we can identify it?

A. There is a transit station there.

1676 Q. That will do; about transit station number two, from that point southeasterly a distance of 15 or 20 feet, what have you in the way of mineralization?

A. We have a rather good, although small vein, with a northwest strike, with gouge and considerable quantities of quartz.

Q. And from thence on to the southeasterly end of the new drift as platted upon this map, haven't you continuous quartz?

A. No, sir, you have not continuous quartz; you have continuous vein.

Q. Haven't you continuous quartz?

A. No, sir.

Q. What do you mean by continuous vein?

A. I mean that that northwest vein which is exposed at transit station 2 is retained practically in the new drift.

Q. And continues to its face?

A. Yes.

Q. What exhibit was it that you referred to this morning, that showed what you called the fault slip near transit station 1109 as shown on exhibit 137; one of your little sketches that you had; I don't remember which it was?

A. I referred to nothing except this map today.

Q. Yes, I think you did. Have you any sketch of this territory covered by this part?

A. Only this. I took this map under ground and sketched

1677 these observations on it underground. Those are the only notes that I have made.

Mr. Dickson: Was it Professor Irving, Mr. Gray, that had a little sketch, showing among other things this slip that is shown on exhibit 137?

Mr. Gray: I think Professor Emmons had a sketch of that kind.

Mr. Dickson: Professor Emmons has not been on the stand this morning. It was a small sketch.

Q. What is the new work that you referred to this morning that has been done by the plaintiff?

A. The new work done by the plaintiff is an extension of the cross cut or drift containing the point 1119 and 3, in a due north direction.

Q. When was that done?

A. Work is still being done; the mouth of that cross cut is being cleaned out.

Q. When was that new work done?

A. It has been done, all of it I guess, within the last two weeks.

Q. All done since you were on the stand before, wasn't it?

A. Not all of it. It had been started prior to that.

Q. And that came out to daylight?

A. Yes, sir.

Q. And what did it disclose before coming out to daylight?

A. It didn't disclose anything in the way of vein matter
1678 except altered granite and stringers of quartz similar to this.

Q. And as I understand you, when you came to daylight you had a body of quartz?

A. Yes, sir.

Q. Quartz on top of the ground at daylight or how was it?

A. No. Beginning yesterday at noon the men started to work deepening the opening to daylight, to bring it down to the lower level of the drift which was then the extreme northern exposure. There is an exposure of quartz and vein matter there that is very much more compact and much more vein like.

Q. Do I understand you correlate the quartz there found at daylight with the quartz shown upon your exhibit 137 in which transit point 1109 is found?

A. No, sir.

Q. You do not correlate it?

A. I do not.

Q. Do you correlate that with anything?

A. The appearance suggests—the idea suggested by the appearance of this trench is that the crosscut may be coming into a faulted place of the vein.

Q. Of what vein?

A. Of the vein which follows from the west up to the point at which it is cut off by this northwest fault vein near transit point 3.

Q. How far north of transit point 3 is it where you come to daylight in that crosscut and find the quartz?

1679 A. I have not measured it, Judge.

Q. Taking your best recollection?

A. I think it is forty-five feet.

Q. You correlate that with what?

A. I don't correlate that with the vein shown in red here, but I do think that it may be the marginal alteration which is near that vein and that——

Q. And which is shown in the crosscut?

A. No, sir.

Q. Where we have transit point 1119?

A. No, sir.

Q. What do you correlate it with?

A. I think that it may be—I don't know that it is—but it may be the marginal alteration, stringers of quartz attendant upon the faulted portion of the vein.

Q. You don't think there is a throw there of forty-five feet?

A. I do, yes, and more.
Q. And what fault is that?
A. On this northwest fault vein.
Q. The Deadwood fault or what fault is it?
A. Oh, no, no. Northwest fault vein exposed at transit point 1119 and the new drift.
Q. Has it any name?
A. I haven't heard it given any name. It is entirely similar to the little one that is exposed in the next crosscut west.
Q. What exposure of quartz have you as you come out to daylight in that crosscut; how much?
1680 A. There is no solid body of quartz exposed there; there are very numerous stringers.
Q. Do you think that is a faulted segment of any portion of the vein shown upon defendant's exhibit 66?
A. I think that it may be—I think that if the trench was extended a slight distance to the north it might be the faulted segment of a vein which has been stoped and which is shown in the——
Q. You mean that segment of it easterly of station 1118?
A. Yes, sir.
Q. Do you think there has been a fault there which has thrown that forty-five feet or more to the north?
A. I certainly do, Judge.
Q. Have you any data except what you have already called attention to to justify that conclusion?
A. I don't know just how much I have called attention to, but I have data which makes me believe that, and that is that I have followed on this drift through the caved stope there a large quartz vein, and I came at transit point 1118 against a fault which terminated that vein so that I could see the exposed end of it; and that that fault is parallel and similar in all respects to other faults with a northwest strike, and which always throw the vein in a left hand direction. And there is that consideration.
Q. And how large was the vein which passes through the point on exhibit 66 near station 1118, where it is cut off by that fault?
1681 A. Twenty feet wide.
Q. Twenty feet wide?
A. Yes, sir.
Q. And you think that the easterly faulted segment of that was found forty-five feet north, where you have no solid quartz at all?
A. No, sir.
Q. What do you think?
A. I think that it probably lies a little more than forty feet north and that the end of this crosscut which is now a trench can be—may be just approaching it.
Q. But the crosscut came out to daylight without disclosing anything that would correspond with what is on the westerly side of the fault, on exhibit 66?
A. That is true.
Q. Do you know the ore bodies on both the veins, at places faulted

easterly or westerly—the stronger ore gives out and a poor vein continues on beyond it?

A. That happens.

Q. Frequently?

A. Yes. I never in my experience in mines saw it happen that a large stope comes up and terminates abruptly against another faulted plane with any reasonable explanation of it other than the stopes and ore bodies have been cut off by a fault.

Q. Do you say there are no branches of a vein or at least stringers of ore running easterly from station 1118 to indicate that the vein was scattering up as it went easterly?

1682 A. That condition—the exact condition there is shown on this map.

Q. Read the question:

Mr. Gray: That is what exhibit?

A. Plaintiff's exhibit 137.

Mr. Dickson: Just read the question?

(Question read as follows: "Do you say there are no branches of a vein or at least stringers of ore running easterly from station 1118 to indicate that the vein was scattering up as it went easterly?")

A. That is true; there are no such there.

Q. I am calling your attention to defendant's exhibit 66?

A. Defendant's exhibit 66 does not portray the conditions as they exist on the ground at that point.

Q. A false representation, is it?

A. Yes, sir.

Q. Well, disregarding the fault feature, as shown on defendant's exhibit, will you say that following easterly from station 1118 to and across the crosscut which runs southerly from the mill tunnel that there are not separate streaks of vein material found?

A. Running from station 1119 and crossing the end line of the Black Rock claim?

Q. No, crossing the crosscut from the mill tunnel?

A. Crossing the crosscut from the mill tunnel there are at least two veins neither of which are coincident with it and part of the vein exposed in the old stope.

Q. That is your opinion, of course?

1683 A. That is my opinion, yes.

Q. On which careful observers might differ; don't you admit that?

A. They apparently have.

Q. An honest differenee?

A. I don't question that at all, Judge.

Q. You spoke of a new crosscut that had been run southerly from the top of the Pyle raise?

A. Yes.

Q. When was that work done, since the plaintiff's case in chief closed—it was started since then, wasn't it?

A. I believe it was.

Q. And that extends, you say, southerly eighteen feet?
R. Yes, sir.
Q. And at a distance of ten or eleven feet you find a vein?
A. Well, I hesitate to call it a vein; it is a miniature vein; it is a veinlet.
Q. What is it, quartz?
A. Four inches of quartz and a tiny blue gouge.
Q. And what is the dip of it?
A. Dip of it—dips to the south at 78 degrees.
Q. Do you undertake to correlate that with any other vein?
A. Well, I don't attempt to make any absolute correlation. I think it may possibly be the very top or dying out end of the Pyle strand, but I would not——
Q. You don't express any opinion about that?
1684 A. No, I would not be sure of that at all.
Q. And haven't formed any opinion as to whether it is to be correlated with the Pyle branch or not?
A. No, sir.
Q. Coming to the 1300 foot level, when were you last in there?
A. Last Sunday night; night before last.
Q. Were you in there very recently in company with Professor Irving?
A. Yes.
Q. Was he with you Sunday evening?
A. No, sir.
Q. When were you and Professor Irving in there together making examinations last?
A. Sunday morning.
Q. Did you make general observations, you and he, as you went through there, and commented upon what each observed?
A. We did not make joint observations in the matter of taking angles of strike and dip or anything like that, but we discussed the situations, certainly.
Q. You discussed where you thought you found the Jersey Blue vein, or a strand or strands of the Jersey Blue vein, you and Professor Irving, on Sunday morning last?
A. Yes, to some extent. I was not there very long with Professor Irving, and I was not with him when he made most of his observations nor was he with me when I made most of mine.
1685 Q. But you went through there in search of the Jersey Blue vein or some strand of it, that was your object?
A. We went down there to observe the conditions as portrayed by Mr. Wiley.
Q. You and Professor Irving went there with the object of discovering if you could the Jersey Blue vein cutting and intersecting the Rainbow lode; wasn't that what you went there for?
A. We went there, certainly, to observe everything there was observable.
Q. Wasn't that one of the objects that you had in view?
A. Yes, sir.

Q. That being so, didn't you and Professor Irving comment upon what you respectively observed when you were together?

A. We did for a few minutes, yes, sir.

Q. Did you discover a strand or what you believed to be a strand of the Jersey Blue vein running easterly; I don't mean due east, but in an easterly direction from the Clark raise, which seemed to have died out, so it could be no longer traced in that direction.

A. No, sir.

Q. Did Professor Irving call your attention to any such strand of the Jersey Blue vein which, followed easterly from the shaft, died out?

A. In an easterly direction?

Q. Yes.

1686 A. In an easterly direction or in any direction, no, sir.

Q. How many strands of the Jersey Blue vein did you find in the area covered by your examination on Sunday morning and Sunday evening last?

A. Two.

By Mr. Gray: Didn't you get that date wrong; wasn't it Saturday?

A. Sunday morning.

By Mr. Dickson: How long were Professor Irving and you there on Sunday morning?

A. Well, let us get that straightened out. That was Saturday that I was there with Mr. Irving, Saturday morning, and probably I saw him in the stopes in the afternoon.

Q. How long a time did you and professor Irving spend together in that examination in search of the Jersey Blue vein?

A. I should say we were together about an hour.

Q. In the immediate area that you have been referring to this morning as having been examined by you?

A. Yes, sir.

Q. I wish you would place upon this sketch, plaintiff's exhibit 133, the geology respecting which you testified this morning on direct.

Mr. Gray: That is a very small scale; wouldn't it be better on a larger one?

Mr. Dickson: I think he can do it all right. This is the

1687 one he testified about on direct, and it will save time.

A. (After sketching.) That is practically it.

Q. The westerly and most northerly of the blue and red lines that you have put on this exhibit 133 is about where the Clark shaft comes down from the 1300.

A. Yes, sir.

Q. What is the strike of what you call the Jersey Blue vein where disclosed in the bottom of that shaft?

A. North 77 degrees west.

Q. And the dip?

A. The dip is vertical.

Q. Between that shaft and where you have indicated upon this

exhibit as shown by what I suppose you call the Jersey Blue vein——

A. Yes.

Q. United with another strand of the Jersey Blue vein?

A. Yes.

Q. Have you observed that strand of the Jersey Blue vein?

A. I can observe that strand for a distance of about 15 or 18 feet in the raise and along the new drift to the point at which it departs from the drift into the body of the Rainbow vein.

Q. And thence to the point of junction, or the indicated junction of that strand with another strand of the Jersey Blue, what is the distance over which you have not observed?

1688 A. 46 feet.

Q. When you get to the point of junction or what you represent as the junction of the two strands of the Jersey Blue vein, what do you have?

A. I haven't seen that.

Q. You have not seen that point?

A. Well, all I have seen is this strong wall of the vein striking and dipping as shown on this map, marked with the degree mark of 80 degrees.

Q. That is the longest blue mark you have put on this exhibit 133?

A. Yes.

Q. So that whether there be such a junction there or in that vicinity of the two walls of the Jersey Blue vein is a matter of conjecture and not of observation?

A. It is not a matter of observation.

Q. Well, you have the point of junction indicated—at that point what is the strike of the long blue streak with which the other has united, as you think?

A. The course is north 73 west.

Q. And what is the dip?

A. The dip is to the south 80 degrees.

Q. What have you exposed in the stope where you have drawn this long blue line on exhibit 133?

A. In the stopes to the east we have a continuous vein exposure going up across two floors and corresponding at least as far as I have drawn that line with a strong south dipping vein cutting across the Rainbow structure.

1689 Q. What is the width of that south dipping vein?

A. The total width of the vein I should say is about six feet. The gouge itself is not over five or six inches wide.

Q. Gouge on either side of it?

A. No, sir, on one side?

Q. Which side?

A. The south side.

Q. No gouge on the north side of that exposure?

A. No, sir.

Q. Did you observe the place described by Professor Irving this morning or yesterday evening, where he saw "a beautiful vein, six

inches of quartz unmistakably in my opinion the Jersey Blue vein or a strand of it." Did you see that place?

A. I don't know what place you refer to.

Q. Did you see any place where there was an exposure of six inches of quartz which you took to be any part of the Jersey Blue vein?

A. Absolutely.

Q. Where?

A. The Jersey Blue vein as exposed, cutting the Rainbow on the south side of the bottom of the wet raise, is marked not only with the wall which cuts across the structure, but with six or, I think it is perhaps ten inches of a good band of white quartz which has the same dip as the wall.

Q. In the stopes easterly of the shaft that was examined by you and by Professor Irving, anywhere in those stopes did you see

1690 a streak of quartz six inches wide, standing vertical, and which you regarded or recognized or believed to be a vein, the Jersey Blue vein?

A. As you stand on the 4th floor of the stopes and look up overhead in the part of the opening that is curved out, due to this gouge going through it, you can see up there some white material which I think is quartz.

Q. How far did you have to look up to see it?

A. Oh, about ten feet, but I did not climb up there to examine it.

Q. Did you regard that as a strand of the Jersey Blue vein going through there?

A. Yes, I think so is; I think it is a part of the Jersey Blue vein.

Q. That six inches of quartz?

A. Yes.

Q. Looking up ten feet in the dark; what kind of a light did you have, a candle?

A. No, an acetylene lamp.

Q. And at that distance you think you could recognize that as a part of the Jersey Blue vein?

A. From where I was I couldn't be even sure that it was quartz, I think it was.

Q. But you think it was part of the Jersey Blue vein?

A. I think it was; I could see it running along with this wall.

Q. You think it was part of the Jersey Blue vein?

1691 A. Yes, sir.

Q. Although you couldn't tell whether it was quartz or not, and couldn't observe its structure at that distance?

A. I didn't go up to look.

Q. You couldn't get up to look, could you?

A. Yes, I could.

Q. Why didn't you go up and look at it?

A. I could see the wall structure going across there so plainly that I didn't examine every foot.

A. I could see the wall structure going across there

Q. If you thought that that was a vein, the Jersey Blue vein, and did not make an observation of it any nearer than 10 feet above your

head, and you could go up to it, and wanted to identify it as part of the Jersey Blue, if you could, why didn't you go up?

A. The fact that that vein cuts across that stope is so plain that it is not necessary to examine every foot of it.

Q. But you understand that the learned gentlemen on the other side differ with you about whether it goes through there or not, and that being a disputed point, and you looking at a timbered logged out ten feet above your head and see something which you conclude was a part of the Jersey Blue vein coming down through the Rainbow hole, and having the ability to get up there and see whether it was quartz or what its structure was, why didn't you go up?

A. I didn't consider it necessary.

3692 Q. Didn't you find any other ground leading through from stopes north of the line that you have drawn here in blue on exhibit 132?

A. Well, I saw a little fissure.

Q. Put it on there; if you found another strand of the Jersey Blue put it on your exhibit 132?

A. All right; I saw a little wall in the stope in the third set.

Q. Is there a little drift running out there?

A. Yes, sir—coming out in this direction?

Q. Well, have you indicated it on exhibit 132?

A. I have indicated it here, yes, by a blue line.

Q. Put the letter "S" over it so we may not be confused?

A. All right.

Q. Was that another strand of the Jersey Blue vein in your judgment?

A. Well, I did not see on that wall any evident vein structure cutting through the wall, but I believe it is a fracture which took place at the time that the Jersey Blue did.

Q. Do you think it is part of the Jersey Blue, a strand of it?

A. Well, I can best answer that by saying no, and then explaining that I think it is a fracture in the ore which took place at the time of the Jersey Blue faulting.

Q. Or later?

A. Well, I think it took place at that time.

3693 Q. Don't you find many fractures of those dimensions in the ore bodies of the Rainbow hole, where there is no fault there except a little crack?

A. Oh, yes; I think every one of them represents the effect of a little crack or fault.

Q. And not the Jersey Blue fault?

A. Certainly all of them do not represent the Jersey Blue fault.

Q. Aren't there in the stopes in the Rainbow mine in many places, almost innumerable places where those little cracks of the dimensions of that last place on exhibit 132 with the letter S over it—that you cannot and do not attribute to the Jersey Blue fault?

A. That is certainly true.

Q. Certainly; there are many of them, aren't there?

A. Yes.

Q. You found gouge in the Rainbow stopes in many places, did

[illegible]

A. I don't think there is much question but the country in which that forest now formed had become solid, as solid as it is today.

Q. You don't know anything about it; you can't know anything about it?

A. I can't know anything about it, no.

Q. The rocks in the earth there even now haven't the rigidity of the wood model you have introduced?

A. I beg your pardon.

Q. The rocks even today are not as unyielding as the wood [H] that you have here?

A. Granite is pretty hard.

Q. Haven't you seen rocks, say limestone for instance, bent almost double without breaking at all?

A. Yes, yes, sir.

Q. That is due to its elasticity, or plasticity, isn't it?

A. Yes.

Q. Plastic condition?

A. Plasticity is a relative term, of course.

Q. What apparent floor records of the forest Blue vein, in your modified form? Blue vein, as shown upon exhibit [I]37, what material appears there?

A. Masses of one of the Kimmeridge beds.

Q. Have you ever seen ... of so, where ... in its downward course the [J] Blue vein splitting up into strands except at this level?

A. I don't think I have seen anything exactly like this.

Q. Or very closely approximating it, in the downward course of the vein?

A. I should say on the whole the vein was unusually uniform.

Q. I think you misunderstood?

A. Yes.

Q. You have seen in the downward course of that forest Blue vein nothing comparable to what you have indicated on the exhibit [K] as a splitting of the vein into branches as its downward course, have you?

A. I think it might be readily observable in other portions of the region.

Q. Have you observed it?

A. I have not observed it.

Q. You have not observed anything comparable to the splitting of the forest Blue vein in its downward course?

A. I can't recollect any such place. To further answer to that question, there is a place in the Black Rock tunnel where the forest Blue vein is split.

Q. I am at the downward course?

A. The divergence in strike is of course accompanied by a divergence in the dip.

Q. Where do you find it in the Black Rock tunnel?

A. I previously testified to the point in the Black Rock tunnel [M] not at the crossing, as it is, where the vein does split and there is a little branch of it follows in a northerly direction for a short distance.

Q. How far a few inches or a few feet?

A. Well, about sixty feet.

Q. The 300 level of the Black Rock to which your attention was invited by Mr. Gray, is that reached through a shaft through the Niagara?

A. Yes, sir.

Q. And how far is it below the surface line there, 100 feet or about 190 feet, isn't it?

A. About 190 feet at that point.

Q. As much as that?

1688 A. Yes, sir.

Q. The north drift on this same level to which I am now pointing, on the 1300 foot level, doesn't that show a blue fault stringer of ore, quartz?

A. It does show it, I believe. I think that the fault on this drift, on the mill tunnel level, should if it were not cut off by another fault, cut that vein.

Q. It doesn't cut it, does it?

A. I don't believe it does. I looked in my notes and do not see any fault.

Q. Don't see any disturbance?

A. But there is between that vein and this one a steep north—mostly east and west fault which might interrupt that fault before it got to it?

Q. Have you been in the Niagara workings?

A. I have been in the Niagara tunnel and in this 300 foot level which is reached through the Niagara tunnel, but no others.

Q. In this fault, indicated as a fault on exhibit 137, to which I now point and which is near transit point 1109, if that continued on its own direction, it should fault the ore bodies in the Niagara which you have examined, should it not?

A. Only in the same level, the 300 level.

Q. Do you find any there in that ore body of the Niagara?

A. I haven't seen any in these faults across there. I don't think they are there.

1689 Redirect examination.

By Mr. Gray:

Q. Mr. Searle, I understood you to testify that this small vein or veinlet cut in the south crosscut from the top of the Pyle raise dipped south?

A. That is erroneous. That vein dips north. It goes to the south as you go up.

Mr. Dickson: I don't see as it makes any difference. He doesn't correlate it with anything.

Mr. Gray: No, I just simply desire to correct it.

direct-examination.

By Mr. Dickson:

Q. I hand you a sample of rock which has been introduced in evidence and ask you whether in your judgment that shows—that alteration manifested in that piece of granite, is due to weathering or surface waters or whether it shows any evidence of alteration as a result of vein action?

A. I don't think there is any evidence of vein alteration in that piece of rock.

Q. That is marked "unaltered but weathered granite, south wall of trench, 35 feet from its east end." That is trench "E"?

Mr. Gray: Well, I don't know.

Mr. Dickson: That is the testimony of Mr. Salisbury.

(Witness excused.)

1700 *Testimony of Fred T. Greene, Recalled, for Paintiff.*

FRED T. GREENE, recalled in rebuttal, testified as follows:

Direct examination.

By Mr. Gray:

Q. Mr. Green, if you will just produce these samples of gouges that you procured?

A. Two samples of gouge marked AX and BX which came from the stope above 1985 drift in the west Stewart mine. These gouges were found on the foot or north wall of the stopes and show the blue tough clay and a great many fragments of ore in pebbles, lying within the gouge itself.

Q. What vein were they taken from?

A. These were taken from the blue vein in the west Stewart mine at a point possibly 100 feet above the 1600 foot level.

Q. Is that one of the well known northwest-southeast veins?

A. That is the vein that gives the name of "blue vein series" to the northwest—the type, northwest-southeast fault veins.

Q. Is that the Lilly May?

A. Edith May is another, the Jessie and State vein, the Emma vein, Jersey Blue, Deadwood fault and another northeast of the Deadwood fault not named.

1701 Q. Mr. Green, were you ever in the 300 Black Rock and in the stope which extends from the easterly drift from the W. H. W. crosscut?

A. Yes, sir.

Q. Does that vein in its course easterly from the crosscut in that stope change its course?

A. It does not.

Q. What is its course there?

A. Its course, as measured on the wall and sighted along the wall with a Brunton was about north 82° east.

Q. How—who prepared or who really had charge of the preparation of the exhibits which have been presented here, the map exhibits of the plaintiff and the detailing of the geology thereon?

A. I had myself.

Q. At the time these exhibits were prepared and at the time you testified had you ever been in this raise from the 1300 Black Rock to the 1100 Black Rock?

A. No, sir.

Q. Did you know about it?

A. Not until just about the time of going to trial. I think it was the day before I went on the stand myself that I first heard it.

Q. Have you, or so far as you know, any of the engineers for the defendant, been in that raise?

A. I never heard it discussed by any of the engineers.

1702 Q. How did it happen that you didn't know of it, Mr. Greene, hadn't you been in that part of the workings?

A. I hadn't been in the 1300 foot level of the Black Rock for a very long while. I don't think that from along about November or December when my first notes on the Black Rock 1300 were taken, that I was in that level again at the west end or towards the west end until very recently.

Q. How did it happen that you did not observe it on the 1200 or the 1100?

A. I didn't see it exposed on the 1200.

Q. Was there any intention of omitting it from either the section or any of the maps?

A. Not the slightest.

Q. How do you fix the position of the Jersey Blue upon exhibit 22 through that section of the floor or level rather near where that raise goes up?

A. I saw it and followed it on the first floor from transit point 424.

Q. Marked on there?

A. I can't see it, no, but I know that is the transit point.

Q. In the stope?

A. In the stope, on the first floor, which was being run at the time and I followed it for a distance of 120 feet east.

Q. About where was that?

1703 A. It was in the back of the first floor, two or three feet north of transit point 424, at its westerly exposure at that time. That transit point is marked on Mr. Searls' map with a round pencil circle and I presume——

Q. Just give it a number?

A. I presume if we refer to the map below——

Q. What station is it?

A. My notes show station 424—no, 423—I don't recognize—424 is about 30 feet west of 423 and from the point 30 feet west of 423 and on the map supplied us by the Black Rock Company there is a station 424, 30 feet west of station 423, and from that point east

ward for 120 feet I was able to follow the Jersey Blue vein, that is the gouge, going through the stope.

Q. It shows on here?

A. That is the point.

Q. What is the course of that gouge as you took it at that time?

A. North—about north 82 or 83 degrees west for the whole length of it, for that whole 120 feet. There are minor deflections from that exact course.

Q. The same is true with reference to the mapping upon the sections necessarily?

A. There it is projected.

Q. That is exhibit 37?

A. Yes, sir.

Q. Have you visited that point within the last three or four days?

A. Yes, sir, I was there Sunday evening.

Q. Will you just state what you observed?

A. The raise on the first floor, that is the floor immedi-
1704 ately above the sill, there was a well defined vein having two gouges, one on the north wall and one on the south wall, separated by a distance of about five feet, in which on the south wall there was six or eight inches of quartz standing practically vertical. On the north wall there was also some quartz and zinc ore of about the same thickness, but between the two there was altered granite with many little seams of quartz and zinc. Immediately south of this south wall there was much rich zinc ore in which the banding of the zinc sulphide butts up against the vertical gouge and approaches it at angle of dip, of 53°. On the north wall or just immediately north of the north wall on the west side of the raise there is again granite. On the east side of the raise the gouge spoken of as being the north wall of the Jersey Blue vein, departs from the raise and is seen in a drift on the second floor of the stope east. It crosses that drift diagonally, still dipping very steeply and along the north side of the drift, approaching the raise, there is a strong gouge which is continuous along the whole north side of this large stope and which dips to the north variously from about 80 degrees down to what is apparently the normal dip of the vein, 64 degrees.

Mr. Dickson: The normal dip?

A. Yes, sir, of the vein, through that section for some 100 or more feet. The stope on the second floor has the shape shown on plaintiff's exhibit 22, on the attached tracing. In this stope
1705 the gouge that I have just now referred to as being the hanging wall at its east end, where it is not influenced by the Jersey Blue vein, has assumed its normal dip to the north—that is normal for this 100 feet of stoping, and further south for about five sets there is very solid rich zinc ore, most of the way. In another set to the north side of the sixth set there is granite, altered granite badly broken and cracks filled with pyrite and zinc. Near the south side of this sixth set there is a very definite gouge and along that gouge on the floor there is about eight inches of quartz with some pyrite and a little zinc in it. That gouge dips to the south here at an angle of 79 degrees and has a strike as it extends westerly from

the stope of north 73 degrees west. It turns going across the back of the stope about two floors above it, could be followed as you would follow one of these pilasters, and then follows it across to the back of the stope. You could see it on the wall going up; you could follow it on uninterruptedly across to where it disappears into the more fully stoped portion of the vein.

Mr. Dickson: Follow what?

A. This gouge. South of this gouge running across the back at an average strike of north 80 degrees west, we find again the solid zinc ore of the Rainbow lode and followed it to its foot wall, which foot wall dips to the north at an angle of from 55 to 68 degrees. In that area the banding of the zinc ore is perceptibly similar to what it was at the raise and dipping 55 degrees to the north. I
1706 have followed that same gouge with its attendant mineralization variously, quartz and zinc——

Mr. Dickson: Didn't he go over all of this before when he was on before?

Mr. Gray: No.

The Witness: I think I described this, but not with the particularity. I described it on cross-examination by Judge Dickson but I did not go into the details.

Q. If there is anything more you can give there?

A. There are some details which I saw on my observations made in the mine in November and December, 1914. This gouge is followed in the stope on the first floor about 120 feet, easily recognizable, and maintaining a steep dip to the south. At its western end, my notes of that show that it dipped 78 degrees to the south, and at its eastern end it has become more steep and was apparently turning more southeasterly. At its eastern end it dipped 88 degrees to the south. In that stope the foot wall of the Rainbow lode is clearly shown.

Mr. Dickson: I am very sure that this is simply a repetition of what he testified to before.

The Court: I understand that this was simply to meet what the defendants testified to.

Mr. Gray: Yes, sir, that is all I desire; if it is repetition we will stop it.

The Witness: This point about which Judge Dickson asked me if the lagging was removed in that stope, if we would not be
1707 able to find the Jersey Blue, I think my reply to him was that it could be found anywhere along that 120 feet.

Q. Mr. Greene, since you were on the stand before, has the Jersey Blue been developed at or near the surface southeasterly from the Jersey Blue shaft?

A. Yes, sir.

Q. By what workings?

A. At a point about 130 feet southeasterly from the Jersey Blue shaft and in the bottom of the deep gulch a tunnel was driven in a

direction a little east of north, and that tunnel went through some 20 feet of wash, where it entered the granite in place, and finally in its face, about 49 feet from the mouth, it was entirely in the granite in place. At a point 42 feet from the mouth of that tunnel there is a south wall of a vein, and from that south wall for the next four and a half feet there is almost solid quartz, and from the solid quartz to the north wall there was about two and a half feet of highly altered granite with a plain gouge on the north wall 49 feet from the mouth of the tunnel.

Q. Won't you give that a mark; mark it A?

A. It is marked on the tracing attached to Plaintiff's Exhibit 4, tunnel A.

(Tracing marked Plaintiff's Exhibit No. 138.)

A. On Plaintiff's Exhibit 138 this tunnel appears as tunnel A. East of that tunnel at 100 feet there is a trench which, at
1708 the time of my last visit, had not gotten through the wash. It is started on a junction of the little side gulch coming down there and the wash is very deep.

Q. Mark it B.

A. I have marked it Trench B on Exhibit 138. 100 feet further to the southeasterly there is a third trench which I have marked C, which at its southern end shows some quartz and manganese running almost east and west. That particular quartz and manganese is ten or twelve inches wide. Immediately north of that, running northwest and southeast is a vein of quartz about three and a half feet wide with a well marked gouge on its north side. This vein has a strike of about north 70 west in that trench, as near as I could determine it in the narrow limits which the trench shows. Southeasterly of that again in the bottom of the gulch the granite is exposed some seven feet high; that is the country rock, and also a vein, are exposed there, and these are faced up, and the vein was followed for a short distance. There there was a vein about four and a half feet wide with very well defined walls and a good gouge on the north wall and a perceptible one on the south. The south wall of that vein strikes north 74 west and dips to the south about 80 degrees. The north wall has a strike of north 71 degrees west and also dips to the south practically parallel to the south wall. We started to follow that, but the time was too short to get very
1709 far, but we found that that was turning more easterly and westerly, and in my opinion that it could be connected up and can be connected up with the vein showing in the small shaft 100 feet east of the face, D. That I believe is the Jersey Blue vein, and it is the same Jersey Blue vein that we have seen followed from that point easterly in the Dewey tunnel and in the Black Rock tunnel.

Q. Which of these points is the point in the Deadwood gulch where the Jersey Blue is depicted upon the exhibit and the model and the surface map of the Defendant?

A. Why, on the surface map, Defendant's Exhibit 64, this is the same shaft which is marked at the southern extremity of what is shown here as the gulch tunnel.

Q. And this point D is where?

A. The point D is 100 feet west of that shaft. At this point about—that would be in the gulch at a point immediately below the first N in the word "Tunnel" which appears in the bottom of the gulch on Exhibit 64.

Mr. Dickson: Put your initial there on Exhibit 64.

A. Very well. This point in the bottom of the gulch which corresponds exactly or nearly exactly with the face D on Defendant's Exhibit 138 is shown on Defendant's Exhibit 64 as being the point where the Jersey Blue vein comes to the bottom of this gulch.

1710 Immediately across from the point marked D on the other side of the gulch the vein has been exposed again where the bottom of the gulch is very narrow; the top of the gulch is only 15 or 20 feet above, and it naturally is wider; but at this point E the vein can be seen again in the granite, and from there it can be seen again in cut C; but as I said before, cut B is not deep enough to get through the wash, or was not at the time I was up there, to show the exposure of the vein, but it can be seen again in the face of the tunnel A, and in the shaft known as the Jersey Blue shaft, and to the west in a number of cuts running northwest from the Jersey Blue shaft.

Cross-examination.

By Mr. Dickson:

Q. Mr. Greene, are you responsible for the geology represented on Section 9, Exhibit 37?

A. Largely, yes, sir.

Q. What part of it are you responsible for?

A. It represents my own conclusions.

Q. When that section was prepared, however, you were not informed or did not know of the Black Rock raise at the 1300 foot level?

A. No, sir.

Q. With your present knowledge as to that raise and what is disclosed in it, where would you put your blue at the 1300 foot level of the Black Rock indicated upon this section 9?

1711 A. I would like to refer to the map before I answer that question; I want to locate exactly where the section line goes across.

Q. Section 9 is taken 30 feet east of the Black Rock raise, according to Mr. Irving?

A. Yes.

Q. If you project it out 30 feet, how far to the north of where you have the blue shown upon this section on the 1300 foot level of the Black Rock would you put it; can you scale it?

A. And using what as a basis for the projection?

Q. Well, you have the shaft 30 feet west of this plane of section; if you were to project it at right angles to the plane of section, how much to the north of where you have it on section 9 at the 1300 level would you represent it with that additional information as to the existence of that raise and what is disclosed in it at the bottom?

A. In the first place it would not be fair to make projections——

Q. Answer my question and then explain afterwards. If you can't answer it, say so.

Mr. Gray: That is assuming that the Jersey Blue strikes east and west?

Mr. Dickson: Well, it is only 30 feet away; it could not vary very much in that distance in strike or dip.

A. Making an arbitrary projection of that kind it would be found about 24 feet north.

1712 Q. Scale it?

A. I did scale it.

Q. On the section?

A. I can't scale it on the section; I scaled it on the map.

Q. This section 9, according to Professor Irving the plane of section is 30 feet easterly of the east side of the Black Rock raise, so that on this section you must have projected it, haven't you?

A. Yes.

Q. Now, instead of having it on the 1300 foot level of the Black Rock as you have it cutting there through the Rainbow lode, you know it should be placed out at the northerly edge of what is represented in red on the 1300 foot level of the Black Rock on this section 9, do you not?

A. Probably, yes, sir.

Q. The bottom of the raise should be there at the north edge, shouldn't it?

A. Yes, sir, the bottom of the raise should be practically at or very close to that north edge.

Q. Of what is represented in red?

A. Of what is represented on here as the 1300 Black Rock level.

Q. It should be substantially at the northerly edge of what is represented in red there, instead of 24 feet southerly therefrom, and showing a picture of it coming down through the vein, shouldn't it; that is true, isn't it?

1713 A. Yes, but part of it cuts down through the vein at that point.

Q. No, no; you have shown it here on Section 9 at the 1300 of the Black Rock, you have represented the Jersey Blue as cutting down through the Rainbow lode 24 feet southerly of the northerly edge of what is intended to represent your Rainbow lode, have you not?

A. The raise comes down through that point.

Q. Isn't that true; answer the question?

A. Yes, but I have no reason to change my belief that part of the Jersey Blue does come down through that point.

Q. Well, I don't suppose you have; but as a matter of fact, you know that the bottom of the Black Rock raise at the 1300 foot level of the Black Rock is in the Jersey Blue vein, do you not?

A. It is in a part of the Jersey Blue vein, yes, sir.

Q. The Jersey Blue vein is exposed in the bottom of that raise at the 1300?

A. Unquestionably; I don't think there is any question about it.

Q. And the bottom of that raise at the 1300 foot level of the Black Rock would be 24 feet northerly of where you have shown it on this section line, and at the northerly edge of what is shown in red, wouldn't it?

A. Yes.

1714 Q. Now, I understood you to say in answer to Mr. Gray that you were responsible for all the geology shown on Exhibit 22?

A. I believe I am responsible for all the geology was put on under my direction, yes, except that which has been added since the court has convened.

Q. Yes; that was put on there by Dr. Weed in pencil; I don't refer to that. And especially is all of the geology on this exhibit which is intended to represent a picture of the Jersey Blue vein intersecting and cutting off the Rainbow lode attributable to you, to your opinions?

A. That is my belief.

Q. Now, again, I see here a raise marked in pencil the Clark raise at the 1300 foot level of the Black Rock, in which you have the Jersey Blue vein. How far is that northerly of where you have represented the Jersey Blue vein to be on this Exhibit 22?

A. Measured in the plane of the raise, it is about 15 feet northerly.

Q. What do you mean by the plane of the raise?

A. The plane parallel to which we took our sections, through that raise; 30 feet west of the plane of Section 9.

Q. From the center of that raise how far is it southerly to what you have shown on this map as the picture of the Jersey Blue vein?

A. It is 18 feet from the center of the raise.

1715 Q. Haven't you, before you knew anything about the Clark raise at the 1300 foot level, and before you undertook to determine what the geology should be which was placed on Exhibit 22, and especially the geology with reference to the Jersey Blue vein on that level—haven't you made a careful study of that level?

A. I have in November and December, 1914.

Q. A detailed study of everything that is observable?

A. Yes, as far as the detailed evidence was to be observed at that time.

Q. And you did not think it necessary to go back there to make any further examination on account of any new work prior to when you dictated what geology should be placed on this Exhibit 22?

A. I did not.

Q. You thought you had all the information necessary?

A. No, that is not the case. If I had known that there was a raise there I certainly would have gone back there.

Q. Where had there been, since last November, to your knowledge up to the time that you put this geology on the map, any new work done there except this Black Rock raise coming down to the 1300, of which you did not know?

A. I don't know of any new work that has been done.

Q. Then all of your detailed study, the purpose of which, I take it of course, was to enable you to determine where if at all the Jersey Blue vein was found intersecting the Rainbow lode on that level—wasn't it?

1716

A. I don't think you completed your question; I don't get it as a question.

Q. Well, I will start it again. Your detailed examination of what is disclosed on that level, the 1300 Black Rock was in part at least carried on or conducted to enable you to determine where if at all the Jersey Blue intersected the Rainbow on that level?

A. Yes, and my conclusions——

Q. And from that detailed study having that object in view, you represented on this map the Jersey Blue vein as being 18 feet southerly of where it is now disclosed in the Black Rock raise at that level, didn't you?

A. This was shown on the map, and for the reason that the last point of observation was in the stope above this level and about 30 feet west of Station 423; from there to the nearest point west of that face of the 1304 drift, the vein is connected across, and it has been projected.

Q. Didn't the stoping shown upon this exhibit, at the time you made your detailed investigation in November last, extend as far north as it now extends?

A. Possibly it did.

Q. Didn't it?

A. I don't know. I can't go through gob to find out how far a stope extends north. The stope was filled north of the point where I saw it.

Q. Of course we understand that the stope there was not in such condition as to enable you to get out to the northerly end of what is now shown on this exhibit?

1717

A. It was not; not on that floor that I saw the Jersey Blue vein.

Q. How do you account for the fact that in your study of the geology of this property in this immediate vicinity with reference to the position of the Jersey Blue vein on that level relative to the Rainbow vein—how do you explain that error?

A. I have explained it by the fact that all the facts that are now available were not available at that time.

Q. Everything was available, except your knowledge of the existence of the Black Rock raise, wasn't it?

A. No, sir.

Q. What wasn't available then, that is now available?

A. The stope was filled from the edge of station 424, within two

feet north of station 424, and that is the last point that I saw the Jersey Blue vein at that time.

Q. Did you see it westerly of that?

A. Not until you got out to the face of the drift.

Q. So you had an exposure of it at 424, or 308 on this map, and another exposure at the westerly face, and nothing between.

A. Nothing that I recognized at that time, no.

1718 Q. So between those points the Jersey Blue vein is represented on this exhibit as a matter of conjecture, that portion between those two points?

A. Yes, sir.

Q. With the knowledge you now have of the existence of the Jersey Blue vein at the bottom of the Black Rock raise at the 1300 foot level of the Black Rock, where would you place the Jersey Blue vein with reference to that raise on this Exhibit 22; draw a line and show me where you would put it?

(The witness indicates.)

Q. How have you indicated that, Mr. Greene?

A. I have indicated it by two parallel blue lines with cross hatching between them at the foot of the Chark raise on plaintiff's exhibit 22.

Q. Give me the course, the course of that representation you have made?

A. The course is south 73° east.

Q. Give it the other way?

A. North 73° west.

Q. What is the strike of the vein as disclosed in the raise at the bottom of the raise?

A. That is the strike of the vein as disclosed.

Q. The same as there?

A. Yes, sir.

Q. During November and December of last year were you in the 1300 foot level?

A. Yes, sir.

Q. Making that patient study, detailed study?

1719 A. I was.

Q. Don't you know that that raise was started from the 1300 foot level in November or December of last year?

A. I don't know that it was. There wasn't any raise at the time of my examination.

Q. I may be misinformed about it. That is my information, but information not from my witness.

A. There was no raise there at that time.

Q. How frequently were you in that level during the months of October and November, 1914?

A. I spent about a day.

Q. Altogether?

A. In that level west of the shaft, yes. I presume about a day—I don't recall exactly how long I was in there. Most of my time on

gone in the stope above the level where the exposures were definite and clear.

Q. From the bottom of the mine, where you have the Jersey Blue ore authority to where you have the Jersey Blue as it was originally represented upon exhibit 22, a distance of 19 feet or thereabouts, what is the material between?

A. That is mine ore.

Q. What you call the Rainbow lode?

A. Yes, sir.

Q. As you went down, after you discovered that that mine did ore, and upwards from the 1200 foot level, I suppose you examined it?

A. I haven't been up, no.

1730 Q. Never been up it?

A. Never been up it any further than the third floor.

Q. Did you go up three floors of it?

A. Yes, sir.

Q. What, if any, evidences did you find in those three ores up from the bottom of the mine of a branching of the Jersey Blue in the mine?

A. I didn't see any evidences. It was not clear. The mine was timbered and lagged and there was a great deal of soft gouge and decomposed granite and—granite that had slid down covering the timbers and obscured the actual lines of any branching. I didn't see any.

Q. You didn't discover any evidences of any branching?

A. I didn't see the branches there.

Q. You don't know whether there were any or not?

A. I don't know whether there were any or not in that particular point.

Q. You, or under your direction, a portion of the mine of the Black Rock mine was driven?

A. No, sir, not any of it.

Q. From the 1200 to the 1000?

A. Not any of it.

Q. Driven by the Elko mills company?

A. I think so.

Q. Were you through that part of it?

1731 A. I was through the mine from the 1200 to the 800.

Q. That four hundred feet?

A. Yes, sir.

Q. In that 400 feet that you were through what evidences of the branching of the Jersey Blue vein did you observe and make a note of?

A. I did not take detailed notes in there for the reason that the mine was very tightly lagged, and I had to take the fact that it was continually on vein mostly on faith. Whether there were branches there or not, there is nothing to disclose any such facts.

Q. So far as you are able to say from your observation anywhere in the mine from top to bottom is there observed any branching of the Jersey Blue vein?

A. There is no branching observable, nor the lack of branching was not observable there.

Q. If, as a matter of fact, we have now at the bottom of the 1300 foot raise a part at least, as you said, of the Jersey Blue vein, and we have another part of it as designated by you originally on exhibit 22, 18 feet southerly therefrom it must have divided into branches on that level, if that be a branch of the Jersey Blue vein as originally shown on this exhibit 22 from station 308 westerly to 331—if that is a branch of the Jersey Blue vein you must have two branches of it there?

1722 A. I should think so.

Q. And 18 feet apart?

A. Yes, sir.

Q. What other branches, if any, of the Jersey Blue vein have you found on this 1300 foot level—assuming that these two are branches?

A. In the sill now the lagging has been taken out.

Q. Where abouts?

A. Between what is marked on this exhibit as the Clark raise, westerly, intermittently, there is lagging taken out.

Q. How far westerly from the raise?

A. Immediately west in one place.

Q. For what distance have you an exposure there?

A. I have an exposure there of about ten feet across the vein.

Q. In length I mean?

A. The length east and west is about five feet. In the back in there there are several small gouges.

Q. Parts of the Jersey Blue vein, in your judgment?

A. No doubt.

Q. No doubt about it?

A. Not in my judgment.

Q. So you have how many branches in that little space of five feet in an easterly and westerly direction and ten feet in a northerly and southerly direction?

A. I can recognize two.

1723 Q. Each of them separate and district from the ones found in the Clark or Black Rock raise?

A. They are small.

Q. And also distinct from what you had originally represented as the Jersey Blue raise between stations 308 and northwesterly?

A. Yes, sir.

Q. So that at least we have five branches on that level west of the Black Rock raise?

A. I have no doubt that there are five branches, very small ones.

Q. What are the dimensions of the most northerly branch, the one at the bottom of the Black Rock raise, how wide is the vein?

A. If you count these two gouges as two distinct branches, that would be about five feet wide.

Q. You have the vein at the bottom of the Black Rock raise about five feet wide?

A. Yes, sir.

Q. With a gouge on either wall?

A. Yes, sir .

Q. Similar to the gouges that you have found in the northerly and southerly walls of that vein elsewhere?

A. Yes, sir.

Q. Generally?

A. Yes, sir.

Q. What is the distance between that five foot strand of the Black Rock or Jersey Blue vein and the one that you have next
1724 southerly therefrom, and westerly thereof?

A. I don't recall that exactly.

Q. About?

A. I didn't make the measurements.

Q. You were in there only a day or two ago?

A. I was in there Sunday night.

Q. I am speaking of the one westerly where you had the timbers removed at intervals, westerly of the Clark raise?

A. I said that the exposure was just west from the Clark raise, as I recall it, and about six feet from that probably the first is shown.

Q. Six feet south of the foot of the raise?

A. Yes.

Q. What is that one; give us the description of it?

A. It is a small black gouge.

Q. Anything else?

A. Gouge.

Q. Just gouge?

A. That is all.

Q. How thick is it?

A. Oh, about quarter of an inch.

Q. Is that a gouge that belongs to the Jersey Blue vein?

A. I have reason to believe so.

Q. Next south of that, where do you come to another part of the Jersey Blue?

A. Two or three feet south of that.

1725 Q. What have you there?

A. Practically the same thing, running northwest—running in a northwesterly and southeasterly direction.

Q. Just a streak of gouge?

A. Yes, sir.

Q. How thick there?

A. About the same maybe, pretty near a quarter of an inch.

Q. A quarter of an inch?

A. Yes.

Q. You recognize that as a part of the Jersey Blue vein?

A. I recognize it as a typical crossing of the large east-west lodes by a northwest-southeast fissure.

Q. You recognize it as a part of the Jersey Blue vein?

A. I believe it to be so.

Q. Next south how far is it before you find another branch of the Jersey Blue vein?

A. About five feet.

Q. And what do you have there?

A. There we have the seam testified to before as being on the second floor, or what I believed to be the seam almost immediately under it, and there is a strong gouge.

Q. On either side?

A. There is a strong gouge along the south side of what was apparently a vein of—striking along with the gouge.

1726 Q. How wide is that vein?

A. I wouldn't be sure. It is several inches wide there.

Q. Gouge on the north side of it?

A. I don't recall that there is any gouge on the north side of it

Q. You couldn't see whether there was or not?

A. I couldn't because it is in behind the timbers.

Q. Southerly from that do you have another gouge?

A. No, I didn't see any other gouge southerly from that.

Q. Easterly from the Black Rock raise, how many strands of the Black Rock vein are on this level?

A. East of the raise, immediately east of the raise is the north strand, visible on two floors.

Q. How wide is that?

A. That is some eight or ten inches wide. That is the north wall of what I have been describing as the five foot vein.

Q. Gouge on either side of it?

A. There is only part of that vein visible in the drift. The drift coming west from the stope discloses this north wall departing from the drift at a point about fifteen feet east of the raise.

Q. Is there a gouge on either side of that?

A. That is the north gouge of the vein in the raise.

Q. How far east of the raise is that?

A. About fifteen feet.

Q. Is there any gouge on the south side of it there?

1727 A. The gouge is not visible on the south side of it.

Q. Is not, what obscures it?

A. Because the drift does not go far enough to reach it.

Q. Easterly of the raise, what other branch or strands of the Jersey Blue vein have you besides the one you have just spoken of?

A. We have no others except that before testified to in the sixth set south, in the stope on the second floor.

Q. The one that was on this exhibit originally when it was originally introduced?

A. Yes, sir.

Q. Mr. Greene, isn't it a fact that in the stopes what you call the Rainbow lode, apart, altogether distinct—far distant from the Jersey Blue vein, that you find gouge in the stopes.

A. You find gouges in the stopes.

Q. Running in an easterly and westerly direction as well as other directions?

A. You find gouges running easterly and westerly.

Q. And northwesterly?

A. You find some gouges running northwesterly.

Q. And of as great dimensions, as massive as the gouge you have here in your original Jersey Blue vein on this level?

A. Yes, and where they are followed out of the stope, they are seen to be faults.

Q. But you didn't follow this out of the stope of a fault
1728 when you platted this, that is at two points only?

A. I can't follow it out of the stope unless I am doing the mining myself.

Q. Do you not in places, in the stopes of the Rainbow lode, find gouges far distant from the Jersey Blue vein as you recognize it, 100 feet in length?

A. Yes, and as I say these gouges, if followed out of the stopes, where they can be followed out of the stopes, show it is typical northeast-southwest fault of the structure, not of the same size, and the same displacement as this, but they, when followed out of the stopes are seen to be northwest-southeast faults.

Q. Haven't you gouges extending fifty or a hundred feet in other directions than northwest and southeast in the stopes, and far distant from anything that you recognize as the Jersey Blue vein?

A. Yes, there are gouges.

Q. Running in all directions through the stopes?

A. No, I wouldn't say that.

Q. Well, in various directions then?

A. No, I wouldn't say that.

Q. They run, some of them, northwest and southeast?

A. Most of them are either parallel to the Black Rock fault or the northwest-southeast veins which cross the stopes at various points.

Q. Some running in other directions and extending for fifty or a hundred feet?

A. I never noticed any such.

1729 Q. The gouges, apart from where you have any northwest fault fissures found in the stopes of the so-called Rainbow lode, could be caused by internal movement in the vein itself, could they not?

A. Yes, and that internal movement would have to be induced by certain forces and where these forces are recognized, where the gouges are significant as being a part of any large movement, or any movement.

Q. Of course they have been created by some force. We all recognize that, had great movement. But haven't you in this vein, as in all other broad veins, gouges formed by the internal movement, apart from any distinct faulting, that is movement within the vein itself, creating gouges?

A. Yes, the natural readjustment of blocks due to faulting, greater faulting—faulting of greater magnitude upon these small slips themselves would result in such gouges.

Q. And haven't you seen in the broad veins, such as this, comparable to this so-called Rainbow vein, and its immense stopes, internal movement in the vein itself, which has given rise to slickensides?

A. Yes.

Q. That is nothing unusual, is it?

A. No. And I have seen that same slickens/ide produced by a northwest-southeast fault across the Anaconda vein where it is forty feet wide and where you couldn't get a knife into any point,
1730 and where there was a slickenside there, and outside of the walls of the vein where there was four or five inches of gouge.

Q. That is not an answer to my question.

A. It is an explanation.

Q. Wait a minute. My question is if it is anything unusual to find in a broad vein slickensides caused by internal movement in the vein itself independent of any other fault traversing the vein in any direction?

A. No, never. A movement of half an inch will make slickensides.

Q. No doubt. The immense mass of a mountain in that movement would create slickens/ides?

A. Yes. They are significant only in their relation with something else.

Q. But you found them where they could not be accounted for in any other way than by internal movement of the vein, one part upon another, haven't you?

A. Yes.

Q. When did you say that you were last in the 1300 foot level?

A. Sunday night.

Q. Anybody else accompany you?

A. Yes, sir.

Q. Who?

A. Mr. Searls and Mr. Winchell.

Q. When you were in there Sunday night you were in there for the purpose of finding, if you could, the Jersey Blue vein cutting the Rainbow, weren't you?

A. We were in there to see the conditions as testified to
1731 and to supplement our former observations as to where the Blue vein cut the Rainbow.

Q. You were in there conducting that examination in an effort to find, if you could, where the Jersey Blue cut the Rainbow, weren't you?

A. It amounts to the same thing.

Q. In that did you observe in the roof of the stope anywhere that open stope that went through a six inch streak of zinc ore that had a vertical dip and which was in your judgment unmistakably a part of the Jersey Blue vein?

A. I saw the six or eight inches of material that accompanies that.

Q. Zinc ore you mean in the roof?

A. I can't tell whether it was zinc ore or not because it was covered with the slime from blasting, the dust from blasting and all you could see in the back of the roof is a wall going up, distinctly, as that pilaster is.

Q. If you didn't see it that ends it. Did you find any branch or strand of the Jersey Blue on the 1300 foot level, or what you recognized as a branch of the Jersey Blue dying out as it was followed easterly, fading out and lost?

A. No, sir.
Q. You didn't observe that?
A. No, sir. I have testified before that I followed that same streak for 120 feet.
Q. As you followed along this drift easterly from the Black Rock raise or Clark raise on the 1300 foot level, when you got
1732 beyond, northerly of anything you recognized as the Jersey Blue on that level, you have the gouge going in there marking what you call the north boundary of the Rainbow?
A. It shows in the stopes.
Q. How thick is that gouge; how does that compare with other gouges that you have been speaking about as a part of the Jersey Blue gouge; comparable?
A. Oh, yes, it is much thicker.
Q. Much thicker do you say?
A. Yes, sir, the gouge itself is in contact with granite.
Q. When was this working on the surface done that you testified about?
A. It was done during last week.
Q. When?
A. During last week.
Q. How far from the mouth of that tunnel do you say you encountered the vein?
A. Forty-two feet.
Q. Just indicate it on this exhibit 138?
A. Forty-two feet from the face. The map has a scale of twenty feet.
Q. What is its dip?
A. It dips to the south about eighty degrees.
Q. At trench "C" I understood you to say you had two veins?
A. Trench "C"?
Q. Do you have two veins there?
1733 A. No.
Q. Do you have the exposures of vein material?
A. I find two exposures of small ribs of quartz.
Q. Which is the more southerly of the two?
A. It was about four feet from the south edge of the trench.
Q. And how far northerly of this did you find the other?
A. About three and a half feet I think.
Q. What was the exposure in the first one; what was the size or width of it?
A. About four inches of hard quartz.
Q. And the other?
A. The other was about the same amount of quartz.
Q. And what between the two?
A. There was broken quartz, hard altered granite and on the north side of the northern seam of quartz there was a distinct gouge.
Q. In your direct, if I did not misunderstand you, you said at trench "D" you found granite and what you supposed to be a vein?
A. No, I didn't say that.
Q. What did you find there?
A. I said "D" was where the narrow part of the gulch had cut

down into the granite. The granite was some seven feet high and we there traced the vein for a width of four and a half feet.

Q. And what did you find there in the way of a vein?

1734 A. There we found a vein with about six inches of quartz on the hanging wall, about three or three and a half feet of highly altered granite with some small gouge seams in it, and on the north side we found six inches of banded quartz and gouge which contained a considerable amount of pyrite.

Q. I call your attention to what is painted in blue to represent the Jersey Blue vein on plaintiff's exhibit 4, and ask you whether in the vicinity of the gulch and a little southeasterly therefrom you found another vein south of what you call the Jersey Blue vein having a course more easterly and westerly than what is shown upon exhibit 4, from a co-ordinate line 1100, northwesterly?

A. What point in the gulch?

Q. In the vicinity, between the southeast line of the gulch there—between that and the co-ordinate line 1100—if you found a vein southerly of what you have represented here as the Jersey Blue, from that co-ordinate line southwesterly?

A. No, I didn't find any vein.

Q. Did you look for any?

A. Oh, yes.

Q. Couldn't find any?

A. I looked all along that gulch and couldn't find any in the vicinity of that shaft. I would like to state that I do not agree here with the width of the vein as shown. I think it should be some four feet wider.

1735 Q. Have you been in the bottom workings westerly of the Jersey Blue claim?

A. No, sir.

Q. You never have been?

A. No, I have tried to get into them sometime ago and never found the entrance.

Mr. Dickson: That is all.

(Witness excused.)

Testimony of Walter Harvey Weed, Recalled, for Plaintiff.

WALTER HARVEY WEED, recalled for plaintiff in rebuttal, testified as follows:

Direct examination.

By Mr. Gray:

Q. Doctor, at the time of your former examination you said that you had never been in the raise from the 1300 to the 1200 foot levels of the Black Rock?

A. I had not been in it and did not know of it until the model was brought in.

Q. You have since been in it, and to the places described by the witnesses who have preceded you?

A. I have, yes.

Q. Do you generally agree with the testimony of Mr. Searls and Mr. Irving and Mr. Greene, concerning the facts there?

A. I do; I find that the Jersey Blue vein is exposed at the bottom of the raise immediately above the 1300 foot level, and I find it again in the stopes.

1736 Q. Unless there is something in addition to what they said—have you anything in particular to say in addition?

A. I find that it is a northwest vein, and with endogenous quartz in it, quartz deposited in the fissure and later than the fissure and following the fissure, and that fissure is not a clay gouge of the Black Rock fault type and age.

Cross-examination.

By Mr. Dickson:

Q. Did you hear the testimony of Professor Irving also this morning?

A. I did.

Q. Do you confirm what he said?

A. I do, sir.

Mr. Dickson: That is all.

(Witness excused.)

Testimony of Frank A. Lindforth for Plaintiff.

FRANK A. LINDFORTH, called as a witness for the plaintiff, being first duly sworn, testified as follows:

Direct examination.

By Mr. Gray:

Q. State your name, residence and occupation?

1737 A. My name is Frank A. Lindforth, I reside in Butte, and my occupation is that of mine geologist and engineer.

Q. Mr. Lindforth, you prepared the two models, plaintiff's exhibit 46 and defendant's exhibit 101?

A. I did.

Q. You placed upon the plaintiff's exhibit No. 46 the working indicating the Clark or wet raise from the 1300 Black Rock to the 1100 Black Rock?

A. Yes, I put that there.

Q. When did you put it on?

A. I put that raise on the Clark model after the model had been delivered to the court room.

Q. That is on exhibit 46?

A. Exhibit 46, yes, sir.

Q. Why hadn't you put it on before?

A. I did not have complete data regarding the section and the location and the position of the cross cut until the model was delivered.

Q. Where did you get the information and the survey from which you did add it after it had been delivered in court?

A. That section and that information was given me by the surveyor for the Butte & Superior interests.

Q. And that was the first time you had received it?

A. Yes, that was the first time the information was available in the form that it could be used to place the raise.

1738 Cross-examination.

By Mr. Dickson:

Q. From whom—through what intermediary or agent or messenger did you receive the information respecting the surveys of the Butte & Superior from time to time; Mr. Passmore?

A. For the Clark interests?

Q. You, from the Butte & Superior for the Clark interests, who generally delivered to you the information?

A. The surveyors for the two companies supplied information for their own models until the last few days, at which time I was obliged to take information as I could get it, so that some parts of the Clark model came from the surveyors for the Butte & Superior interests, and some parts of the Butte & Superior model came from the surveyors for the Clark interests; but until that time I had received the information separately.

Q. From what surveyors for the Butte & Superior?

A. Mr. Shields gave me more of the information for the Black Rock model.

Q. When did you put on the defendant's model, exhibit No. 101, the so-called Black Rock raise from the 1300 up to the 1200; was it at the same time you put it on the plaintiff's model or afterwards?

A. To the best of my recollection it was done on the evening before I put it on the Clark model, and I came to the court room the next morning to place it on the Clark model in order

1739 that the two models should be alike.

Q. When did you get the information, if you remember, from which you did finally put on the models that portion of the raise?

A. Well, it was within a day of the time at which it was placed on the model; there was considerable information involved in the placing of the raise, and it was not complete until the evening before I placed it on the Clark model.

Q. What surveyor for the Clark interests furnished you with information for the benefit of the Butte & Superior?

A. Mr. Hogg and Mr. Passmore from time to time.

(Witness excused.)

Testimony of Horace V. Winchell, Recalled, for Plaintiff.

HORACE V. WINCHELL, recalled on behalf of plaintiff in rebuttal, testified as follows:

Direct examination.

By Mr. Gray:

Q. Mr. Winchell, did you examine the specimen of gouge that Mr. Burch presented as coming from the Jersey Blue, marked B-2?
A. I did.
Q. Can you say whether or not that sample of gouge contains endogenous mineralization?
1740 A. It does; I can observe sulphide minerals, one of which I take to be argentite, upon the small fractures of the recent quartz in the gouge.
Q. Did you examine a small stope easterly of the W. H. W. cross cut on the Black Rock 300?
A. I did to the height of about 15 feet above the level.
Q. Did it extend beyond that?
A. It evidently did. I did not go up into it.
Q. Is that east of the lit-le drift that is shown on the model and on the maps?
A. It is east from the cross cut, and the raise is in that drift.
Q. What is the course of the vein as disclosed east of the cross-cut?
A. I have it noted as north 82 degrees east.
Q. And does it change its course in that stope as far as you are able to observe?
A. There was no such indication.
Q. Have you examined the 800 west drift on the Pyle strand in the Black Rock?
A. I have.
Q. Has that work been going ahead recently?
A. It has been going ahead very rapidly since the trial began, and since I was on the stand before, but very slowly before that.
Q. What did you observe in there as to whether it is following the Pyle strand on the 800?
A. 804 drift follows the Pyle vein to a short distance west
1741 of survey station 1155. At that point the Pyle vein is left by the drift, which from there westerly departs to the north along a small slip or fault which is from two to four inches in thickness, and which slip has been followed to the face, a considerable distance beyond the face shown upon defendant's exhibit 71. The main portion of the Pyle vein continues to the westerly, and leaves the side of the drift west of the station 1155, and has a strike of south 80 degrees west, three feet in thickness, and another branch of it a short distance further west, with 12 inches of quartz and manganese, both of them dipping to the north about 85 degrees.

Q. Mr. Winchell, have you examined the 1300 Black Rock since you were last upon the stand?

A. I have, a portion of it.

Q. That is the portion near where the so called Clark raise leaves the 1300 Black Rock?

A. Yes, sir.

Q. Had you ever been in that raise at the time you were upon the stand before?

A. No, sir; I did not know of the existence of such a raise.

Q. Will you just state now in your own way what you observed there and what conclusions you drew therefrom?

A. My previous examination, as nearly as I can ascertain from my notes, was in January, 1914. I found at the foot of that raise, or about one floor above the very foot, because there was a
1742 large pile of muck, soft wet mud and gouge that had been coming down the raise, on the immediate floor,—the Rainbow vein consisting of a very large solid mass of zinc ore, dipping to the north at a flat angle; some of the strands of zinc ore were nearly flat; some of them have been bent down a little just to the south of this raise; the north dip is between 50 and 60 degrees to the north. On the south side of the raise upon the first floor is a vein marked by gouge and breccia and recent white quartz, having a thickness of more than 18 inches—probably four or five feet—dipping in a southerly direction, but nearly vertical, going directly across the banded structure of the Rainbow vein at that point. This vein, which is itself composed of walls and gouge and mineral which has been deposited in it, presents two features; one that of a fissure with accompanying gouge; later than that mineralization, quartz and zinc ore has been deposited in and along it, since the fissure was formed. Upon the second floor there is a connection between this raise and the little drift which has been recently extended upon the hanging wall of the Rainbow vein. The Rainbow vein there likewise is large and solid, and this drift extends westerly from a stope. Just at the raise and east of it, the same nearly vertical, steeply south dipping Jersey Blue vein, with its gouge and breccia and zinc mineralization can be seen clearly, cutting into and crossing a portion of the Rainbow vein in a southeasterly direction. The
1743 angle between the strong gouge which follows the north side of this drift and the northern wall of the Jersey Blue at that point is 30 degrees, as determined by holding a triangle overhead and looking at it in the back. The Rainbow vein there has a very strong gouge, as would be expected in the immediate vicinity of the crossing of a fault vein. In the stope south of this drift is a strong breccia and gouge and vein which can be seen not only in the western face of the stope on this floor, but in the western face upon the third floor, and in the back of the third floor and going on up to the fourth floor, crossing over and continuing on to the east. It then has a strike more nearly east than it has in the raise. This wall is so strong and well marked that large pieces of ore have fallen down into the stope, and it is there also accompanied by the miner-

alization parallel to the Jersey Blue, and subsequent to the formation of its fissure. The main Rainbow vein is intersected by fractures, and those fractures sometimes overlap a little. They are not constantly followed through the Rainbow vein in the direction of the plating or fissuring of the Jersey Blue, which is entirely to be expected, because of the zinc mineralization which followed upon the Jersey Blue fracturing. There is to a certain extent a healing of the fractures which occurred in the Rainbow vein in connection with this Jersey Blue faulting. It is very similar to the fracturing which is commonly observed in Butte where a large vein upon its course encounters a harder rock, such as the aplite. A large solid
1744 mass of ore coming up to a body of aplite, splits up into stringers in passing through this aplite, and frequently contains not enough ore to be mined. Such a condition is presented where the Jersey Blue faults the Black Rock, except for the fact that the material between the stringers in the Black Rock is ore of an earlier period of deposition. We have the same shattering and fracturing and splitting as the vein passes from the granite across at an acute angle, this great Rainbow vein, and we have the mineralization introduced into the small fractures of the Jersey Blue, and we have one of those fractures mineralized into a continuous band of ore.

(Sketch made during last answer by Mr. Winchell marked Winchell Sketch Plaintiff's Exhibit No. 139.)

Q. So that upon the sketch marked Winchell Sketch exhibit 139, the red represents the vein and the brown represents the aplite?

A. The brown checked band represents the aplite. The various fractures, of which two or three are quite distinct, seen upon the 1300 foot level, are seen just below upon the 1400 foot level in precise correlation in position and strike with these fractures of the diverse splintering—parallel——

Mr. Dickson: We have said nothing about that 1400. Surely this was all gone into.

The Court: I know, but if this new disclosure on the 1300 will correlate with them, I think he has a right to state that; I
1745 think it is proper rebuttal; it is simply occasioned by his story of what he saw on the 1300.

(Defendant excepted.)

The Witness: Upon the 1400 foot level of the Black Rock in cross cut 1414, not shown upon exhibit 24, I find in my notes three strong fault gouges, one just south of station 449 on exhibit 82, and one 11 feet south of station 450, and the smaller one 15 south of station 450. The northern one strikes north 80 degrees west and dips vertically; the next one to the south strikes north 75 degrees west, marked as a two foot fault, and the notes or particulars of the most southern one I have not got; but I have always been impressed with the fact that in passing through at this very acute angle, the Jersey Blue vein splits the Rainbow into several pieces. Upon this 1400

foot level also in the west face near its west end is a strong vertical fault with a strike north 80 degrees west. Taken together, and correlated with the fractures and the vein at other points upon strike and dip, I can reach no other conclusion than that we have here the actual point of crossing of the Rainbow by the Jersey Blue.

Q. Have you again examined the mill tunnel, and the new work done therein?

A. I have.

Q. What have you to say as to the development of any vein or an extension of this vein that is shown in the caved stope east of station 1119?

1746 Mr. Dickson: If it will be of any assistance to you, Mr. Gray, we are willing to concede that Mr. Winchell, with reference to exhibit 133, will corroborate Mr. Searls.

Mr. Gray: Well, we will just let him state his observations.

Mr. Dickson: All right. It makes no difference.

A. (continued). Work has been recently performed in the mill tunnel in at least three or four directions or places since I was on the stand before. The cross cut in the tunnel has been extended further south, and the drift has been extended—it is marked on plaintiff's exhibit 137 "New Drift," to the southeasterly, to connect with the extension of this cross cut. Another working is being extended to the easterly toward the end line of the Clark claim. These workings disclose jointed, somewhat mineralized, rather fresh granite. It is mineralized by small fissures. These fissures have a general northwesterly and southeasterly direction. They are vastly different in their appearence and in their size from the material shown along the south side of the old stopes colored in red upon plaintiff's exhibit 137, and if continued in their own direction will pass across the north side line. There is no continuous vein whatever disclosed in these new workings between the last point seen of the vein colored in red, which has been followed easterly from the Niagara tunnel, and the easternmost portion of these workings.

Along the southern margin of this vein is a zone of granite
1747 which is somewhat altered and softened and blanched. A cross cut has been extended to the north across the north side line of the Black Rock claim. This cross cut has come out to daylight in the side of the gulch. In the bottom of that cross cut and near its northern end, at a distance of about 45 feet from the northern limits of this vein which is there marked by the red, we come to very soft, almost cream colored granite, and a few feet further to the north that granite proves to be filled with quartz; quartz near the surface, much crushed, probably broken by the creep down the hill to the north, but the trench being dug there now is disclosing vein material, and I think without doubt will soon come to the faulted extension to the east of the vein shown in the western portion of the mill tunnel workings. That fault is precisely the same in appearance, with a little more quartz and a little stronger gouge—considerably more quartz than the fault shown near station 1107 in this working which connects the mill tunnel with the

Niagara tunnel. Here we have a fault which faults the vein to the north, as shown upon defendant's exhibit 66, and which there undoubtedly extends to the Niagara tunnel, at which point also no trace of it is found, the main north strand of the Rainbow vein continuing without any visible displacement whatever, right past the point where this fault should be seen. I therefore confidently believe that the faulted extension of this vein north, which is north of the side line, will be found beneath the property lying north of the
1748 Black Rock there—I don't know the name of the claim; it seems to be a fraction between the Raymond and the Black Rock.

Q. Mr. Winchell, Mr. Wiley has stated in his familiarity with Butte that it is not unusual that anywhere in the Butte district you find these little seams everywhere; do you find such seams as are shown on plaintiff's exhibit 137, and as disclosed in the mill tunnel almost everywhere in the Butte district?

A. You do. A sketch of every cellar dug in the solid rock in this camp will show similar joints and small fissures, and I have photographed many of them in past years.

Q. Have you followed through the new workings the Jersey Blue vein from the Jersey Blue shaft southeasterly to the shaft—I don't know what it is called, but the place where we have all agreed that——

A. The gulch tunnel you mean?

Q. Yes, the gulch tunnel?

A. I have examined that, and my observations accord with those of Mr. Green, with the addition that, running westerly following along the bottom of the gulch, I find an aplite dike much silicified and containing pink manganese and some sulphides, a vein running easterly and westerly which can be traced up the gulch for a considerable distance, and without gouge, tightly adhering to the granite on both sides, which is not the same vein nor one of the same character of veins as the vein disclosed in these new workings
1749 and connected with the Dewey tunnel and the Black Rock tunnel workings.

Q. Is it like the Jersey Blue any place where you have seen the Jersey Blue?

A. It is not; it has no gouge nor apparent plane of movement. It is connected with an aplitic dike.

Q. Some question was asked Mr. Searls by Mr. Dickson concerning the faulting of the granite before it had solidified. Prior to the time of the fractures which made up the east and west veins, were there any intrusions into the Butte granite?

A. There were; there was a period, which was omitted by Dr. Emmons in describing the episodes or geological occurrences here; that was the period of quartz porphyry intrusion. The quartz porphyry had invaded the granite after the consolidation or the solidification of the granite, and has in turn been cut by the later veins. Therefore it is no conjecture nor geological romance, but an absolutely established fact that the granite was solid and not plastic—

and was probably cold before the earliest period of vein mineralization.

Cross-examination.

By Mr. Dickson:

Q. Speaking in reference to the sample of gouge that was handed to you by Mr. Gray, and which he stated, I suppose correctly, as having been a sample taken by Mr. Burch from the Jersey Blue, you said there was argentite in it?

1750 A. Yes.

Q. Isn't argentite a secondary mineral?

A. Very often.

Q. Very near the surface frequently?

A. Often near the surface and often at great depth.

Q. And deposited into cracks and seams in the lower lying rocks?

A. Very frequently, but it is mineralization.

Q. As a result of the deposition of the vein material you get argentite as a secondary mineral?

A. You might or you might not; you might also have it as a primary mineral.

Q. It may be either?

A. Yes.

Q. Are there very many places in the stopes of the Rainbow, apart from the Jersey Blue fault or the Black Rock fault or the Deadwood fault, where the ore is loose and so loose that it has to be timbered to keep it from caving in and dropping?

A. The quartz is frequently broken; I could not say that it was in any case entirely apart from the Jersey Blue fault or the Black Rock fault or the Deadwood fault or any other fault.

Q. Have you found it in places where it was loose, so loose that it required to be timbered to keep it up from breaking down and caving away, as far as you knew where it was not close to either of those faults?

A. No; I may have found it without knowing that it was near a fault, but that was probably due to the great width of the

1751 stopes and the large cubic capacity of the excavations, which makes the ground extremely heavy at all times.

Q. You spoke of the three stringers of fault gouge that you found on the 1400 foot level?

A. Yes, sir.

Q. They are not represented on the 1400 foot level, exhibit 24, are they?

A. No, they are not. That is one of the map maker's oversights.

Q. And do you correlate those, now, those gouges that you spoke of on direct examination, with the Jersey Blue fault?

A. Yes, sir.

Q. Had you so correlated them with the Jersey Blue fault when you were on the witness stand before?

A. Yes, sir.

Q. You called no attention to them, did you?

A. No; I did not discuss that particular level at that particular point. I was describing the general structure, and did not go into details.

Q. Well, you testified about the presence and the evidence of the presence of the Jersey Blue fault on that level being on the south side of what you call the Rainbow lode, did you not?

A. Over here, then in cross cut 1410 and west of cross cut 1406 and in cross cut 1416.

Q. I mean when you were on the stand in chief?

A. Yes, but not at that particular point.

1752 Q. Now, this cross cut northerly that was continued through beyond anything that was shown on plaintiff's exhibit 137 and driven out to daylight, you say you have quartz there?

A. Yes, we have a soft, very light colored vein granite, containing quartz, quite a large amount of it.

Q. Do you agree with Mr. Searls that there is nothing that could be called a solid body or continuous stringer of quartz there at that place?

A. No solid quartz; it is solid vein, but it is very soft.

Q. Nothing comparable with the easterly end of the old stope at the point where you think it is faulted?

A. No, not yet; we have just come to the southen margin of that.

Q. What have you disclosed so far in the trench—you say—you think that if the work is continued far enough to reveal the faulted segment of the vein—what have you up to the present time in that trench?

A. Soft and much altered, light colored granite, containing quartz, crumbly quartz and stringers of quartz, a large amount of quartz.

Q. What do you mea nby a large amount?

A. In some portions over several feet, thirty or forty per cent of it is quartz.

Q. How thick?

A. I said over several feet.

Q. Anything else disclosed in that trench at the present time?

1753 A. Considerable stuff that has sloughed in from the surface.

Q. Is there anything in the trench, any showing of a vein that is comparable with the easterly end of the stope at the place where you say you believe it was faulted and thrown forty-five feet to the north?

A. On the easterly end of the stopes in the old filling there is nothing comparable with that; but if you go a little further——

Q. I am not speaking of the filling; I am speaking of the sides. Mr. Searls said that the vein there at the eastern end of that stope is about twenty feet wide?

A. Yes.

Q. Have you anything comparable to that in size?

A. Yes.

Q. In that trench?

A. Yes.
Q. Of vein matter?
A. Yes.
Q. In this trench at the daylight cross cut?
A. Yes.
Q. What is it?
A. I just told you what it is.
Q. Twenty feet of ore?
A. No, twenty feet of vein granite, of light colored, soft, highly altered and carrying quartz.
Q. The drift running westerly from the crosscut from the mill tunnel to where it comes to the easterly end of the ore stopes
1754 there, as I understood Mr. Searls, at that place that vein, the eastern end of the vein had been stoped for a width of twenty feet?
A. I don't know how wide the stope is, but I think there is 12 or 14 feet of stoping there at least.
Q. That meant commercial ore at least?
A. Yes, I think so.
Q. Of course you haven't—you have nothing yet disclosed in your daylight tunnel to compare to that?
A. No, we have not.
Q. Point out on this map the fault that threw that segment forty-five feet to the east?
A. That fault is seen going against the east end of the vein, possibly following down through this drift marked "new drift," departing from that drift upon the north side at a point about 15 or 20 feet from the main drift and probably connecting with this fault shown in the cross cut.
Q. That should, if it continued on its own direction, have faulted the ore in the Niagara, should it not?
A. I don't know. It should not have faulted it any more than this fault faults the ore in the Niagara.
Mr. Gray: This fault just referred to is at what station?
A. There is no station number here, Mr. Gray.
The Court: That is the fault on the letter "C" in "rock"?
A. Yes, sir.
The Court: On what exhibit?
1755 A. Exhibit 66.
Mr. Gray: Between stations 1107 and 1108?
A. Yes, sir.
Mr. Dickson: Now, neither that fault which you have last referred to nor the one which you think threw the easterly segment of this vein forty-five feet north, neither one, so far as you have been able to discover, has faulted or disturbed the ore in the Niagara?
A. No, but it has faulted and disturbed the ore in the stopes of the Black Rock claim—the main vein, as can be plainly seen, terminates or stops in the downward direction at the fault marked blue upon your stope model.
Q. That is not an answer to my question.

A. No, I can't say that it faults anything in the Niagara.

Q. Neither one of them?

A. No, sir.

Q. And if continued, unless they terminated before they reached that, they should have faulted it should they not, both of them?

A. Well, we can't say; we cannot see what is in the old Niagara workings, their old workings; they are largely filled and are partially inaccessible, and we cannot see. We can see what is the situation a little below there on the same dip.

Q. You have spoken in your direct examination a short time ago, Mr. Winchell, of the fact that this fault in which you find
1756 the figures 1119 on exhibit 137 had not faulted the Niagara ore bodies?

A. So far as I can discover from the openings accessible, I can not trace that fault through them.

Q. You spoke of a vein in aplitic rock?

A. Aplitic.

Q. Having an easterly and westerly course which on this exhibit 4 of plaintiff's, running up the large gulch which is shown upon exhibit 4 and—the large gulch which is also outlined upon plaintiff's exhibit 138——

A. This aplite dyke which is somewhat mineralized.

Q. Is it aplite or aplitic?

A. Well, it was aplite first. Now, it is aplitic because it has got some other stuff added to it.

Q. Extends westerly there and slightly south of tunnel "A." How far south from the mouth of that tunnel?

A. About eight feet south of the portal of that tunnel.

Q. Has any development work been done on it?

A. No, it is not necessary. It can be seen at places going up the gulch in a westerly direction and as you go west the plainer it is, the further from the outcropping of the Jersey Blue vein, until it is finally lost in the bank just east of the trestle.

Q. Having a course east and west practically?

A. Yes.

1757 Q. What it contains or how rich or how poor it is there has been no work done to disclose?

A. No, the prospector evidently didn't think it worth while to find out.

Q. The prospector and the mine owners of the Elm Orlu didn't think it worth while to do any work on the east 650 feet of their vein for more than forty years either, did it, or thereabouts?

A. I suppose as far as that goes you might go back a thousand years and say nobody prospected it.

Mr. Dickson: That is all.

(Witness excused.)

Testimony of Walter Harvey Weed, Recalled, for Plaintiff.

WALTER HARVEY WEED, recalled in rebuttal, testified as follows:

Direct examination.

By Mr. Gray:

Q. Were you in the 1700 foot level of the Elm Orlu today?
A. I was.
Q. Did you examine the Jersey Blue as it was disclosed there?
A. I did.
Q. How far has the working extended from the cross cut?
1758 A. About 12 or 15 feet. On account of the irregular face it is impossible to say exactly.
Q. Is it a drift?
A. It is a drift.
Q. And the raise?
A. The roof of the raise is about 18 feet I should say above the sill floor.
Q. What is the width of the vein as disclosed in this working?
A. Seven feet and a half.
Q. And what is its dip?
A. 76 degrees south.
Q. And its course, as disclosed in the workings?
A. Its course is north 65 degrees west, taken by going through one end of the vein as exposed on the west side of the cross cut and sighting to a candle in the middle of the vein in the drift to the eastward.
Q. Is its character the same as you described it heretofore, that is its character as disclosed in the raise and in the drift?
A. In the raise it is quite wet, it is much more wet than it was in the crosscut. The other characteristics, the mineralization, is about the same; it has the same crushed material in the center, pyritization, granite badly fissured and seamed with quartz and manganese and it has the same clay, a seam of clay which passes from one wall into the center, and the mineralization is just about the same as it was in the cross cut.

1759 Cross-examination.

By Mr. Dickson:

Q. Nothing of any value in it?
A. It has some zinc ore and some galena in it. It is not commercially valuable at the present time.
Q. Just at present?
A. No, it hasn't any better ore shown than it has in the cross cut, where it had some commercial ore.
Q. I am speaking of the drift.
A. I am speaking of the drift now.
Q. Any commercial ore in it?

A. It looks just the same as it did in the cross cut, where it had a few inches of commercial ore.

Q. Has the cross cut been extended any farther than when you were on the stand before?

A. It has been extended very considerably farther.

Q. How much farther?

A. I have forgotten how far it was beyond the Jersey Blue when I last saw it, but it is now forty-five feet beyond the Jersey Blue drift and turns and at that turn it goes northward cross cutting the vein at right angles for a distance of forty-five feet further, the breast being now in granite.

(Witness excused.)

Mr. Gray: The plaintiff rests.

1760 SUR-REBUTTAL.

Testimony of Albert Burch, Recalled, for Defendant.

ALBERT BURCH, recalled in sur-rebuttal, testified as follows:

Direct examination.

By Mr. Dickson:

Q. Mr. Burch, recently have you been upon the cross cut that has been spoken of by the witnesses for the other side running southerly from the top of the Pyle raise?

A. I have.

Q. And did you find any vein therein or evidences or appearances of a vein?

A. I found a seam of quartz, yes.

Q. About how far southerly from the crosscut?

A. Eleven feet.

Q. And do you correlate that with any other vein which you have observed?

A. I can hardly say that I can do so because there are so many seams of quartz in that territory southerly for a hundred feet throughout that country or for miles, I imagine.

Q. Is there any other cross cut running in any other direction from the top of that shaft?

A. There is not.

Q. Last evening were you in the cross cut running northerly, coming out to daylight, spoken of by Mr. Winchell and Mr.
1761 Searls—you know the cross cut I mean—in which they were in search of the easterly faulted segment of the vein easterly of the old stopes?

A. I was in the cross cut last night, yes.

Q. What did you find there?

A. I found—I think perhaps I better get an exhibit that shows a little more than this does.

Q. You are referring now to defendant's exhibit 66?

A. Defendant's exhibit 66, yes. Cross cut referred to turns nearly north from a point indicated by my pointer which is the terminus on this map, defendant's exhibit 66, of the drift running northwesterly from what is shown as the shaft.

Q. Station 1118?

A. Yes, 1118. The cross cut was turned almost due north or a little east of north extended out to daylight and a trench has been extended still farther. The distance from the terminus as shown on this map to the point where the cross cut came up—came out to daylight is 48 feet. Then a trench has been extended in the same direction for 38 or 39 feet more.

Q. What is disclosed in the trench?

A. The trench shows some quartz near the mouth of the trench proper, some altered granite and is apparently the downward continuation of the ore body delineated on the 300 level of the Niagara, upon defendant's exhibit 101, at the extreme east end.

By the Court: What working is that?

A. At the extreme east end of this working, being the most
1762 easterly working shown. That is probably the same thing continued up to the surface; I can see no other interpretation of it at all. I confess that I have not seen that particular working; I am simply going on the testimony that there is a body of ore down there; I believe that is not disputed.

By Mr. Dickson: You speak now of the 300 foot level?

A. The 300 foot level, yes, sir.

Q. In the trench did you find any evidences or any disclosures which in your judgment would point to the conclusion that there was found in that trench a faulted segment of the vein which terminates at the end of the old stopes at station 1118 on defendant's map exhibit 66?

A. Well, there is no vein which terminates there; the stopes terminate there.

Q. I meant where the stope terminates?

A. There is no evidence that I can see that what has been discovered in the tunnel and trench is the faulted segment of that vein at all; it apparently goes right across.

Q. Do you find any evidence that points to the contrary?

A. Yes, I do.

Q. What is it?

A. If the ore body were terminated by a fault and the ore were picked up immediately on the other side of the fault at some other point, to which it had been thrown, I would expect to find
1763 ore of substantially the same character, at least for a short distance, as that which had been disclosed on the other side of the fault. But you do not find it. What you find is the altered granite and quartz that belongs in the territory, generally speaking, to the east of this particular ore body.

Q. Were you in the 1300 Black Rock level last evening?

A. Yes, I was in the drift off the second floor.

Q. That is the drift running westerly from the Clark raise that our friends on the other side spoke of yesterday?

A. No, it is the drift that they spoke of that was driven out of the stopes following what we have designated as a mud seam.

Q. Did you observe anything there that in your judgment has any bearing upon the question as to whether or no on that level the Jersey Blue or Black Rock vein is found intersecting the Rainbow lode?

Mr. Gray: That is objected to as not proper rebuttal.

(Objection overruled; plaintiff excepted.)

A. No, I saw nothing whatever to justify any such interpretation.

Mr. Gray: I don't want to persist in view of your honor's ruling, but Mr. Wiley went fully into that drift. That is the reason we offered rebuttal about it. I don't want to be technical about it.

1764 Mr. Dickson: Did Mr. Wiley say anything about the gouge in it?

The Court: Well, it will be brief no doubt. Proceed.

A. The drift to which I have referred starts westerly from the stope at the point at which I hold my pointer now, which is at the upper end of an arrow pointing to the dip 80 degrees. That drift has been extended 26 feet. It has a course, following the mud seam referred to, of north 85 degrees west for the first 17 feet.

The Court: I don't remember any testimony about that drift at all; I thought the drift was at the upper end.

Mr. Dickson: The drift at the upper end is running easterly, but there is another drift running westerly from that floor of the stope. Professor Irving and some other witness testified about it.

The Court: Possibly. Very well.

A. The drift was started by the plaintiff for the purpose evidently of following the mud seam, and was driven by the Butte & Superior Company for the plaintiff until it was ordered stopped, and has since been continued by the Butte & Superior Company, but is now stopped; and the mud seam which has been referred to heretofore in my testimony as being about two inches wide where they started on it, has turned from a course of north 85 degrees west around to a course of south 71 degrees west at the first 26 feet from where it

1765 started, and the drift follows the mud seam. The mud seam has also weakened so that in the face I could not insert my pick more than half an inch into the crack.

Q. Were you on the 1700 of the Elm Orlu last evening?

A. I was.

Q. Has there been any new work done since you last testified respecting it?

A. Yes, sir; the cross cut has been extended about 16 or 17 feet, and the raise started on the so called Jersey Blue vein has been extended perhaps three or four feet.

Q. Confining your attention to the new work done since you were last upon the stand, and particularly the northern termination of it, I wish you would state what you observed as to what has been disclosed in that new northern termination of it. I wish you would state what you observed as to what has been disclosed in that new work?

A. Referring to plaintiff's exhibit 26, the north wall of the main Black Rock vein has been encountered in the working since I saw it last.

Q. How near the face?

A. Fifteen feet from the face; and the cross cut beyond that is in unaltered country rock.

The Court: Through the Rainbow there in your judgment?

A. Yes, entirely beyond, yes. The nature of the gouge is the same as it is everywhere else marking the north wall of that
1766 vein and the unaltered country rock is found immediately beyond it, and I don't think there is any question but that the Rainbow lode has been crossed. The gouge is about three inches thick, strikes north 83 degrees east and dips eighty degrees to the south. This is a marked change from what we—from where we saw it last 200 feet above.

Mr. Dickson: Marked change from what?

A. In the dip. There it was dipping about eighty degrees to the north and it has entirely come around, changed its dip, and in dip is now substantially parallel with what the plaintiff has called the Jersey Blue vein on the same level.

Q. What has become of the northerly dipping branch of the Rainbow lode?

A. That is the northern dipping branch of the Rainbow lode, but it joins with the main Black Rock or Jersey Blue lode.

Q. You mean to say that the Jersey Blue has passed through the Rainbow then?

A. No, I didn't say that. The cross-cut has passed through the Rainbow lode.

Q. Is the Rainbow lode disclosed in that cross cut, do you think?

A. Yes.

Q. What part of it?

A. The northern dipping branch of it.

Q. Where you have the north dipping branch and the Black Rock going down as one?

1767 A. Going down as one, yes.

Q. What is there back of the gouge, immediately south of and in contact with the gouge, in the way of mineralization?

A. There is merely—there is fairly good zinc ore and quartz. I question whether it is quite commercial ore but there is about ten feet of zinc ore and quartz and some manganese immediately south of the heavy gouge.

Q. Ten feet in thickness in which the zinc is visible to the eye?

A. Yes, ten feet in width and in addition to that there are several feet further south of what we have been calling the criss-cross structure, veins of quartz and manganese running at all angles.

Q. Stok work?

A. Yes—through the rock.

Q. As I understand, it is claimed by the plaintiff that it is a physical impossibility, mechanical impossibility that the Black Rock fault could have forked and one branch of it extending westerly practically coincident with the north wall of the Jersey Blue vein and the other southwesterly, as a straight fault, through the so-called Rainbow lode. Have you prepared any model from which you believe you are able to make clear that that is not a physical impossibility?

A. I have.

Q. Just produce it, please and give your explanation of it.

1768 A. In considering the question asked by counsel we must remember that while granite is certainly as hard and rigid as wood, at the same time the granite as found at great depths, where the fractures occur that represent the fault, was in such a condition owing to the pressure, that it would bend as well as break, and that while by the use of the hand on this block of wood I cannot make any impression on it at all, at the same time a similar shaped block of rock under pressure of billions of tons and at additional depth, could easily bend and move.

Q. Without breaking?

A. Without breaking possibly, and yet also it might break. A good deal of the deformation in the rocks of the earth is due to bending as well as faulting and breaking, and is often seen in the bands of sedimentary rocks, which no doubt bend more readily than the granite; but it is also easier to determine that they have bent than the granite. I have in my hand what represents, in modeling clay, a section of the earth in the region that we have under consideration. I have cut it through in an easterly and westerly direction along the line of the Black Rock fault, which, however, cannot be considered as simply a simple plain fissure. There are always several strands to it. I have also cut it through along a line to represent the fault which for some distance follows the Jersey Blue or Black Rock vein. It is

1769 obvious, that if I have cut these lines vertically with my knife there would be no difficulty of movement up or down without any deformation. But there may also be a movement to the west along both planes, and while we have made that movement without any deformation except to break another slip across the body to the south, and if you will observe defendant's exhibit 65, you will see that there are represented here a number of strands of the fault running through the territory, connecting one fault with another. That is the condition that actually exists on the ground and while I have not cut this putty or molding clay along these strands I have represented the position of them by lines on the top of it, and the breaking along this would also serve to take up some of the movement, and there is no question whatever but that a movement of that sort could exist. Now, if you will refer to plaintiff's exhibit 4 and also to exhibit 25, and defendant's exhibit 65 you will see what is claimed to be the continuation of the Jersey Blue vein by the plaintiff in the

position similar to this secondary fault which I have shown on the south side. I could just as well have made a number of cuts in several places along there and the movement would have adjusted itself just as readily as that does; and my own belief is that there are a large number of these little secondary fractures running out from the main fault.

Mr. Dickson: That is all.

Cross-examination.

By Mr. Gray:

Q. Have you the line of junction between these two
1770 branches upon the dip of the Black Rock fault?
A. Yes, that would show by taking these apart.
Q. Well, I mean have you used that in making your explanation, assumed that the line of junction is along the dip?
A. The——
Q. No, can't you answer yes or no and then explain?
A. I don't know what you mean.

Mr. Gray: All right, that is all.

Redirect examination.

By Mr. Dickson:

Q. What is the dip of the Black Rock fault, vertical or otherwise?
A. It averages about vertical but it varies; the different strands have different dips at different places.

Recross-examination.

By Mr. Gray:

Q. Both the Black Rock and Elm Orlu shafts are vertical?
A. Yes, sir.
Q. They both show the Black Rock fault on one side near the surface and on the other side in depth, do they not?
A. I don't know whether it is the same strand that shows in depth on the opposite side from what it shows on the surface, but they are shown crossing.

(Witness Excused.)

1771 *Testimony of John W. Finch, Recalled, for Defendant.*

JOHN W. FINCH, recalled for defendant in surrebuttal, testified as follows:

Direct examination.

By Mr. Dickson:

Q. Calling your attention to plaintiff's exhibit 137, and what is marked "New Drift" thereon, were you in there last night?

A. Yes, sir.

Q. Had that been extended beyond where it was when you were on the stand before?

A. Yes, sir.

Q. What does that drift follow?

A. It follows one of the links in the conjugate system at the east end of the Black Rock claim; it follows a vein.

Q. All the way continuously?

A. All the way down to a connection with the mill tunnel cross cut.

Q. Is it now connected with that?

A. Yes, it is connected with that on the vein shown in red in the cross cut.

Q. Were you last evening at the cross cut that has been run north, the new work, in an effort to discover the easterly faulted segment of the vein; I mean that part of it which they claim was faulted at the easterly end of the stoping shown practically on the mill
1772 tunnel level, or actually on that drift from the mill tunnel?

A. Yes.

Q. What did you find disclosed in that cross cut and in the trench in connection with it?

A. I found the variety of altered granite which properly belongs between the southerly part of the Black Rock vein and the northerly branch of it, and nothing else, except a few little seams of quartz. I found nothing corresponding in character of the mineral matter, in appearance or in form with the vein which has been opened along the old caved stope on the mill level.

Q. Going back from that to the new drift again, what is the strike of that vein which you say is followed continuously to a connection with the cross cut referred to?

A. That means a double answer.

Q. All right.

A. The main part of the tunnel, the old part of it, and the beginning of the new drift, follow on the identical south wall of the vein which was opened in the old stope, and reopened in the recent tunnel work, the strike of which will be observed, by the pointer which I am holding on the map, is very nearly in a straight line along the south wall of the stope and along the first part of the new drift. At that point, by far the more prominent of the veins constituting the

new work or stock work, goes out just about at the point where the letter "N" *is* the name "New Drift" is shown. That in its
1773 strike corresponds with the largest and strongest of the individual veins in the cross cut tunnel, and it will be observed that when the pointer is laid upon that and upon the point where it crosses out of the new drift, that it is also in a perfectly straight line with the south wall of the main vein. The drift has followed off on a minor vein, branching from the more prominent one in the first 20 feet of the drift. This is followed continuously, and is just one of the extending offshoots from the vein system.

Q. What is there in your judgment to justify the representation of quite a broad vein here on this exhibit 137 at the westerly end, which is represented as having been faulted and cut off and displaced?

A. There is nothing whatever to justify all of that. Starting at the point where the two drifts branch, the main tunnel drift and the one branching toward the north, the one toward the north follows for about that distance, about seven or eight feet, in what is probably old fill, but not even absolutely surely that. Past that point toward the northwest the drawing upon the map is accurate insofar as it shows a vein structure running along the side of the drift. There is black quartz in one of the links of this vein system followed along the side of the drift, and that is absolutely all that can be seen. It is in place, and not an old working. Consequently from a line about like this (drawing) there is no justification north of that for the representation in red. Moreover, the drawing
1774 is accurate in the region which I now indicate in the showing of vein or vein matter of rather definite form for a width of about five feet, which is not materially different from the width of the vein as shown to the west in the old working, and little different from the width of the vein for some distance east to the point where it crosses out of the new drift. The map in other words, shows a sudden change from a great body of vein matter to a narrow vein, and such a sudden change does not exist.

Q. Do you know the faults spoken of by Mr. Winchell somewhat deeper on the Black Rock levels?

A. Mr. Winchell testified yesterday, and indicated levels in this region of the defendant's model, being from the 900 level up to the 500 at the easterly end of the mine, stating that there was a fault cutting across and terminating the ore, a northwest fault. Such a fault does not exist, and I might say that if it did exist and followed the habit of the northwest faults, it would throw these ore bodies toward the northward, but they have more of a general tendency to turn toward the southward. Moreover, it followed the 900 stope continuously and absolutely uninterrupted to the east end line of the claim.

Q. So, if there were any faulting of the ore on the 900 east, that fault fissure could not have extended down below the 900 level?

A. No.

Q. Or it would have faulted the ore bodies below?

A. I know the ore is uninterrupted, because I have been
1775 in those stopes, and they follow it continuously through that region.

Q. Were you on the 1700 of the Elm Orlu last evening?

A. Yes, sir.

Q. In what you have to say I must confine your attention to the new work which has been done in the crosscut running out from the Elm Orlu shaft, work done since you were last on the witness stand. I will ask you to describe that?

A. The last time I saw it it was about in this condition as represented on defendant's exhibit 84 and the new work extends beyond the mapping upon that exhibit, and has passed away from a zone of interlacing stringers into a solid body of zinc ore, whether commercial or not, at least containing visible zinc for a width of ten feet, and for a width of 15 or 20 feet south of that containing a mass of interlacing vein matter which is practically solid, south of the zinc ore body. On the north wall of the zinc body is a heavy gouge of four to six inches in width, and 18 inches of crushed material, a gouge which resembles in every respect the gouge which has been followed along the Black Rock vein from the Black Rock tunnel to the 1300 foot level of the Black Rock. The ore body and the gouge are in such a position as to correlate precisely, as it should, with the Black Rock vein developed above. The gouge has a very slight dip to the south, indicating that the Black Rock vein has been
1776 followed from the surface downward, and is pursuing its own course and maintaining its own form and its own character.

Q. And you believe that it is the Black Rock vein which is disclosed near the face of that long cross cut on the 1700 of the Elm Orlu?

A. It is absolutely identical with the Black Rock vein that I have seen above, and I believe it is that and nothing else.

Q. Can you sketch the working on the 1700 level that you have just described, and which you say discloses what you believe to be the Black Rock on this section 21, exhibit 85?

A. Yes, sir. (Drawing.)

Q. Have you completed it?

A. Yes, as well as can be done without drafting conveniences. I think that is reasonably accurate, and it represents, I believe, upon the cross section, as it does upon the plan map, an exact reproduction of the Black Rock vein on the 1400 foot level in character and form.

Q. Were you last night in the new drift running westerly from the second floor of the stopes on the 1300 foot level of the Black Rock?

A. Yes, sir. A new drift has been driven, the first twelve feet of it.

Q. Driven from where?

A. Starting from the second floor as shown upon plaintiff's exhibit 133 at a point where a blue line is shown passing out to the westward on the second floor.

Q. A faint blue line; you don't mean the heavy blue line?

1777 A. This heavy blue lines, yes.

Q. On what exhibit?

A. On exhibit 133.

Q. All right, go ahead?

A. 12 feet of that drift was driven by the plaintiff and from that time on it was driven by the defendant to a distance of 26 feet. It starts out about in the direction shown by the blue line upon the map. It, however, turns around towards the southwestward until it has passed beyond the south limit of the sill floor of the 1300 foot level and its direction last is as you have it here.

Q. Passed southwesterly of the entire stoping?

A. Of the *still* floor; not of the stope. The second floor of the stope extends farther south than the sill floor, showing that the sill floor has possibly not developed over half of the width of the ore body. This which started out as a mud seam or gouge or both has in the last end or near the last end of the drift assumed a course of south 73° west.

Q. How much of a deflection from the course on the first ten feet?

A. About 22 degrees. Without making any mark upon the map I am holding my protractor in the direction which it has last assumed. Moreover, along the north side of this drift the material is clearly visible and it is solid quartz ore and there is not shown
1778 on the north line of this drift any gouge in the position represented by the two dotted lines upon plaintiff's exhibit 133.

Q. What two dotted lines—these are the ones I remember that were put on by Mr. Searls. It has been claimed, Mr. Finch, when Mr. Searls was upon the stand that it is a mechanical impossibility that the Black Rock fault could have forked on its downward course or strike, having two branches or forming two branches, one running westerly practically coincident with the north wall of the Jersey Blue or Black Rock vein and the other southwesterly as a strike fault through the Rainbow lode. Do you think that that claim is susceptible of refutation; if so, I wish you would explain to the court?

A. Yes, I am very sure that it is capable of refutation. I am also very sure that the illustration which was made of it——

Q. By the wood blocks?

A. By the wood blocks, contains at least three fundamental fallacies and do not, as a matter of fact, represent the physical conditions which are involved in the faulting of the rocks of the earth. The material, which was used of course is wood. That is not stronger than granite, but it is stronger than the propelling force which was used to acutate the model, namely the strength of a man's hands—you cannot bend that wood. The other fallacy is of the same nature so far as the force which was used in demonstrating the
1779 model—or attempted demonstration—is concerned. It has no more relation to the force which exists in the earth which produces faulting than has the strength of a man's hand to the strength of this wood. Moreover, the block of wood was not faulted; it was sawed. If the force which had been exerted upon it and there had been along the block of wood certain lines of weakness, or if there had been certain obstacles to the course of fracture in it, and a machine of sufficient power had been exerted (used) the fault might have been produced in it. If there had been a knot here where

block "B" is illustrated, precisely the sort of fracture that is shown here might have developed. But the physical fallacy, after all is that the rocks do not bend or adjust themselves. This block might have been made with the proper mechanical equipment to illustrate what the rocks would do as Professor Emmons illustrated in his little block, exhibit marked "E3," this wood might have represented what the rocks do by being deformed, as E3 has been deformed. It is true that if we take these rigid materials we leave gaps as we attempt to move the parts, but these gaps can be removed if sufficient pressure, as a powerful clamp, were used upon it, which would represent something like the pressure and stress in the earth when the rocks were ruptured. There is another fallacy in the model: it assumes our direction of fracturing must follow straight lines so that no gaps or openings are left when the rocks move, one upon
1780 the other. A fault which is recognized by all who are concerned in this case is notoriously irregular in detail, particularly where it passes through regions in the rocks where the strength of the material is variable. Take it in the region of the Black Rock shaft where the stopes containing ore and the adjacent country rock are arranged in quite irregular relations, it is found and accurately shown upon the Black Rock fault, and its branches are seen to turn irregularly, which in many places are exceedingly apparent. If the angle which I now indicate were shown upon the wood model it would be three or four times as much of an angle to which the rocks would have to adjust themselves. The motion upon this fault is generally considered to have been considerable in a vertical direction. Therefore rocks overlying this sharp bow in the fault which I now indicate here adjust themselves to a very sharp curve.

Q. You are referring now to defendant's exhibit 88?

A. Yes. It could be equally well illustrated on the block model in section 31, where it will be seen that the fault follows a very devious course down through the earth, and I have followed that devious course myself in many instances and have seen the fault underground in a very short distance change its direction thirty or forty degrees. Now, it may seem strange that the rocks of the earth can adjust themselves so easily, but we find as a matter of fact that they do. It is not a matter of theory. We find in mining
1781 that the timbers gradually take weight and head blocks in the sill floors are crushed down before the rocks fracture themselves. It shows a certain degree of elasticity in the rocks. Moreover, that the rocks will bend and warp themselves we can see all over the earth in all the mountain ranges where the gneiss rocks, the hardest there are, are crumpled and twisted and folded back and forth upon one another; in other words, they are capable of being bent into almost any form. There is another reason why rocks will adjust themselves. It is well known, and everybody who has looked into a quarry knows that the rocks are not a solid homogeneous mass but they are divided by planes which are generally known as joint planes, and they are divided practically into distinct and separate blocks, nicely fitted together but nevertheless all ready for any readjustment which may be required of the rock. Furthermore,

I agree with Mr. Wiley exactly that the rocks have passed from their most solid form to their weakest form, which is the present form of them along these veins in the history of the mineralization of these veins and the subsequent faulting. The mineralization of the veins has brought about these changes in the rocks which has so many times been described——

Mr. Gray: Is this sur-rebuttal Mr. Finch is going into now. It seems to me he described the development of the geology here in his opening.

Mr. Dickson: This is confined to an attempt to refute the claim of Mr. Searls, that is all.

1782 The Witness: This merely has to do with the strength of materials.

The Court: I think it is admissible.

The plaintiff excepts and exception allowed.

A. (Continuing:) It will be observed that some of these highly altered pieces of granite can be picked to pieces with the fingers. That alteration of the granite has taken place along these great lodes, the Black Rock and Elm Orlu and along the main joined lode as it goes west. These regions, therefore, are the natural lines of movement for a fault.

Q. Why?

A. Because they are softer and easier to break through than the great mass of the country on either side. Moreover, they are soft and yielding to a sufficient extent so that the Black Rock fault on its strike and on its dip can take the sharp bends which I have described and the rock still adjust itself and fill any openings that mechanically might appear to be required for the movement.

I have only one more thing to say on this matter and I think it is a simple and obvious thing. The main difficulty intended to be illustrated, apparently, by the block model in wood is——

Mr. Dickson: Do you mean Mr. Searls' block model?

A. Yes. Is that if an arc shaped line or strand in the granite if it is moved to the west, for instance, or if it is moved to

1783 the east, will open up and leave a space. Now, if a straight line is drawn as a cord across that curve which is here developed for a considerable distance it will be found that the curve has been developed for a distance of some one thousand feet east and west. Now, the Black Rock fault, although we cannot get at it exactly, is indicated to have here a throw say of fifty feet horizontal component, which is the only component which causes any difficulty even in regard to a solid wood model. If the Black Rock fault has had a throw of fifty feet and if that throw is divided between its two branches, one on the Black Rock and one on the Elm Orlu, twenty-five feet would in that case belong to the Black Rock part of the fault—it might be more or it might be less. If you move this whole mass of country 25 feet you only have to adjust the rocks north and south a distance of about two and a half feet for every one hundred feet to make that fault possible; and the rocks could do

that almost if they were perfectly rigid. Not being rigid it is the easiest thing that a fault ever did.

Mr. Dickson: You may cross examine.

Cross-examination.

By Mr. Gray:

Q. In what direction do you assume that that horizontal movement was?

A. A throw of the Deadwood fault is seen to be toward the east, if you look northward.

1784 Q. So that the movement along the Black Rock fault would be in what direction?

A. The north side of it would be towards the east.

Q. North side of it would be towards the east?

A. Yes.

Q. And you say that the movement along it, from a displacement of fifty feet—25 feet would belong to the Black Rock and 25 feet to the branch?

A. More or less.

Q. Just lay your pointer on the 800 Elm Orlu, on the Jersey Blue vein as it is developed north of the Black Rock fault?

A. The Jersey Blue vein is developed south of the Black Rock fault as well as north of it. This is just as much Black Rock fault as this is.

Q. Mr. Finch, you spoke of the Black Rock fault there adjusting itself to the vein through which it runs and to the blocks of ore or rocks in the vein. That is also true of the northwest fault, isn't it; they do the same where they strike a quartz vein?

A. Yes, to a certain extent.

Q. Well——

A. Yes, they do change their strikes and dips as they should when they pass through materials of irregular strength.

Q. You said something here about not being able to find this fault Mr. Winchell said was perhaps disclosed in the deeper workings, or the fault which was shown in the little drift or cross-

1785 cut northerly from the mill tunnel. Won't you step over to your own exhibit here, your model 101. You show a fault cutting off the ore on the 800 level on the east, which has a northwest course, don't you?

A. No.

Q. What is it?

A. It is one of the internal slips in the ore body.

Q. It is marked in blue as a fault at the easterly end of working-823 and 817 and is shown here, isn't it, on 815?

A. No, that is an east and west one, on 815.

Q. Well, you show it at the end of the ore on 823 and 817, don't you?

A. It doesn't cut off any ore at all.

Q. Now, won't you just——

A. No, it doesn't—it follows the ore structure along in curves and below there is a stope extending to the east without any interruption whatever.

Q. And isn't it true that you have painted white on the easterly end and east of that slip, which represents granite upon your model 101? Won't you just answer that please? And then if you have some explanation make it; isn't that true?

A. Well, you have it painted in blue on your model 101.

Q. Won't you just answer that question, and then if you have some explanation you can make it. Isn't that true?

A. It is true that it is painted on the model in blue, but
1786 it is not an internal slip between branches of the Black Rock fault; that is perfectly clear.

Q. Have you anything developed beyond that in the way of ore on that level?

A. It is developed immediately below in the 900, but not on the 800 level.

Q. No; your 815 crosscut is right in granite, isn't it, as shown upon the map Exhibit 71?

A. Not all of it.

Q. Well, the portion of it which lies east of the workings I have been referring to?

A. No, not all of that portion.

Q. Well, how much of it?

A. About half of it is in the east and west part of the main vein, in good ore.

Q. The workings that I have referred to as coming up against the blue slip upon the model are workings 817 and 823?

A. Yes. Not 815.

Q. The portion of crosscut 815 on which the northerly—how many feet is that; measure it?

A. About 25 feet.

Q. That is in granite, isn't it?

A. That is mostly granite; it is altered granite.

Q. This ore body that you have been following in 823 is not disclosed in 815, is it for that 20 feet?

A. Only in this sense, that it is all part of the same body; the main richer part of the vein runs along uninterrupted and unfaulted.

1787 Q. Just lay your ruler on 823 stope.

A. 823 stope also runs east and west.

Q. Yes. That ore body that is shown in 823 stope does not extend beyond this blue slip and is not shown in the northerly portion of 815 crosscut, is it?

A. Not on this level.

Q. All right.

A. It does below.

Q. Now, there is another northwest fault that you show in your 900 foot level, isn't there, apparently cutting off the ore in 921?

A. That is not a northwest fault.

Q. Well, what is its course; lay your ruler on it?

A. It is not a northwest fault in the sense that it is one of the blue veins.

Q. Well, it has a course northwesterly?

A. It has a northwesterly direction, yes.

Q. And that terminates the ore in 921?

A. The direction is north 70 degrees west. It does not terminate the ore; it follows the direction for a ways in ore itself.

Q. Don't you show it terminating the ore on your model 101?

A. No, we do not.

Q. What do you show in the working 921 on the model?

A. There is no means of representing it; we show it where it cuts through the workings, where the working cuts it. There is no means of representing on this model, as there is on a
1788 plan map, where that vein comes in and goes into another working.

Q. Tell me how you have colored the working easterly of that fault in 921 upon your model exhibit 101, and please answer the question?

A. We have colored it just as the facts are found, with the ore running off to the south of the drift extending east of 915.

Q. Now, Mr. Finch, to ask you a leading question, you have colored it white, representing granite, haven't you?

A. No.

Q. East of that slip in your working upon 101—I don't care what you have colored it on that map; if you want to explain it you can do so, but just answer my question; how is it colored upon your model?

A. It is colored white.

Q. To represent granite?

A. It does not represent vein, that is true, but I think it is only fair to state that granite within the vein is not fresh granite and is not so represented upon other exhibits where it is possible to do so; it is the altered granite of the vein.

(Witness excused.)

1789 *Testimony of Walter H. Wiley, Recalled, for Defendant.*

WALTER H. WILEY, recalled in surrebuttal, testified as follows:

Direct examination.

By Mr. Dickson:

Q. Last evening, Mr. Wiley, were you in company with Mr. Finch and Mr. Burch on the 1700 foot level of the Elm Orlu?

A. I was.

Q. Confining your attention to the new work on that level that is, work that was done since you were last upon the stand, describe to the court what is disclosed in that new work and what deductions you draw from such disclosures?

A. The crosscut level has been extended, turned in a northerly direction, and at a point some 8 feet from its face it has passed out of the vein across which it was driven, and into the granite beyond, showing that at this point it has cut the hanging wall of that vein. Between the ore—rather low grade ore—of the vein and the granite, there is a distinct streak of gouge having a direction nearly east and west, about north 83 degrees west, and a slight dip towards the south, about 79 degrees from the horizontal. Thus, instead of dipping as the vein above, towards the north, the vein here dips a little
1790 toward the south. The position where this vein is cut is shown upon the skeleton model 101 about where I now hold my pointer. The pointer would therefore indicate as we trace it down from the 1400 foot level above, the probable position of this gouge streak, which forms the hanging wall of the vein.

Q. The Black Rock vein?

A. It is the same vein in my opinion which is developed in the 1400 foot level and the 1300 foot level above, and these levels are upon the Black Rock vein; therefore I unhesitatingly term it the downward continuation of the Black Rock vein. It has also been called the Rainbow lode. I am willing to call it that, although, if I do that, I want to make this explanation: The last we saw above on the 1300 foot level, or just above the 1300 foot level of the Rainbow lode, was what we have termed the north branch or the connecting branch of the Rainbow lode. The main Rainbow lode continues downward nearly vertically, and would be several hundred feet south of this northern end of the 1700 foot level. The connecting link where last seen had a rather flat dip towards the north, a dip running as flat as 50 degrees, or even less in places. The dip from the 1300 to the 1400 foot level of the Black Rock is slightly toward the north, and the dip from the 1400 of the Black Rock down to the 1700 of the Black Rock at the point where the hanging wall of the vein has been developed, would be slightly toward the
1791 south. The direction, in other words, of this downward continuation is the direction of the Black Rock lode as developed for a distance greater than 1400 feet through the Black Rock or Clark raise to the Black Rock tunnel. In other words, the vein, as it goes to the deep, takes the direction of the Black Rock lode above rather than of the connecting link of the Rainbow lode. If the Black Rock lode cut through the north connecting link of the Rainbow lode, then the Rainbow lode itself would appear away north of this position, continuing the dip where last seen to the north; so that in my opinion the vein cut in this new work, the hanging wall of the vein cut in this new work on the 1700 foot level is the downward continuation of the Black Rock lode, and it also represents the united Black Rock lode and north connecting link of the Rainbow lode. There is no separate Rainbow lode developed at that level. Another thing is that this 1700 foot level of the Elm Orlu is on exactly the same elevation as the 1600 foot level of the Black Rock.

Q. Exactly the same?

A. Within a few feet; as far as I know exactly the same, allowing, of course, for the grades in that distance. The 1600 Black Rock

develops right through the Black Rock shaft and in the drift running to the west the Black Rock lode, and along that we also have a streak of gouge similar to that in the 1700. This, continued in its own direction towards the west, would connect with this
1792 point in the 1700 foot level, so we have the downward extension in the section developed, and we have also the extension on strike from the same elevation in the Black Rock mine. This 1600 foot level, has three distinct streaks of ore as shown upon the plan map, Defendant's Exhibit 84 and the direction on the strike to which I referred on the skeleton map is shown where I now hold my pointer, and what I believe to be the northern portion of the Black Rock lode on the 1600 foot level where developed by drifts to the west would show. South of this in the Black Rock there are, it is true, two other bodies of ore, all of which I believe to be part of the Black Rock lode, although they are separated by material that is granite as shown on the crosscut, granite somewhat altered. The conditions therefore in this 1600 foot level of the Black Rock at the same depth as the 1700 Elm Orlu being very similar at the two crosscuts, we have not only the vein running substantially east and west on the hanging side, both in the 1600 Black Rock and the 1700 Elm Orlu, but we also have mineralization lying to the south. Another point of similarity is that this central portion in the Black Rock south of the hanging wall about 50 feet also dips slightly toward the south, the same as does the southern portion of the vein as cut in the 1700 Elm Orlu.

Q. Were you down on this new drift on the 1300 that has been spoken of?

A. Yes, sir, I was there.

1793 Q. State what you saw on the 1300 in that little drift that has been mentioned?

A. The 1300 foot level of the Black Rock from the foot of the Jersey Blue or Clark raise, from the Black Rock raise which goes right above, has been opened a distance of some 32 feet across to the south sill, right across where the blue streak is shown upon plaintiff's exhibit 22. It shows the ore, nearly solid ore, continuous right through that, and that there is no such blue streak as shown upon this exhibit.

Q. Well, you will have to confine your attention to the new work, Mr. Wiley; to this new drift. You cannot go into the vein shown in the stope where the timbers were removed?

A. Well, the timbers had not been removed before to the extent that they were last night. It is very much plainer now. This drift driven on the second floor starts in a nearly westerly direction and continues in a southwesterly direction and follows the little mud slip on which it started, showing the solid ore on either side, and reaches a point a little south of the sill which is immediately beneath.

Q. Anything else?

A. Well, that describes the new work.

Cross-examination.

By Mr. Gray:

Q. You think that there may not be any more strands in the crosscut northerly on the 1700?

1794 A. I think the crosscut has reached the hanging wall.

Q. In other words, you think there won't be any more strands cut there?

A. No, I think it has reached the ultimate hanging wall.

Q. And what is the reason for your belief?

A. That it has penetrated into the granite, and that the strikes and dips of this wall correlate with the position of the wall in the workings above.

(Witness excused.)

Testimony of Henry P. Morse, Recalled, for Defendant.

HENRY P. MORSE, recalled for defendant in surrebuttal, testified as follows:

Direct examination.

By Mr. Kremer:

Q. You are the same Henry Morse who testified previously in this case?

A. I am.

Q. Do you know, Mr. Morse, the date upon which the raise from the 1300 Black Rock to the 1200 Black Rock was started?

A. It was started in August, 1914; August 12th.

Q. When was it completed?

A. October 24th, 1914.

Q. Since that time what use, if any, has been made of that

1795 raise from the 1300 Black Rock to the 1200 Black Rock?

A. It has been opened continuously ever since it was driven, and used as a raise for the transfer of waste from the 1200 Black Rock to the 1300; it was drawn off at the bottom, and trammed along the 1300 sill.

Q. This raise that you refer to, do you identify that as the downward extension of the so-called Clark raise?

A. Yes, sir.

Q. Approximately how much waste would you dump through that portion of the raise during 24 hours, and how continuously did you keep that up?

A. Well, it was intermittent, according to the litigation work that progressed in the west end of the mine; but as much as 500 tons in a month, maybe, or 25 tons a day; it varied considerably. It was open continuously, and never covered up for any purpose.

Q. And in continuous, if not constant use?

A. Yes, sir.

Cross-examination.

By Mr. Gray:

Q. When did you furnish the surveys of that to the plaintiff?

A. While I was in court just now I noticed a note. I have a list here of the cross sections of the raises that we kept as a record, and in this loose leaf book we have the raise in question, and I

1796 have a note here which I just noticed a few minutes ago.

Q. Made by you?

A. Made. I should judge from the handwriting, by Mr. Shields.

Q. I don't care for any notes not made by you?

A. Well, Mr. Shields was mentioned by Mr. Linforth as furnishing the surveys to him, and he mentioned these surveys given to Mr. Linforth, 8-8-15. He mentioned giving a survey to Mr. Linforth on that date.

Q. When you procured those notes and gave your testimony just now, you knew that those were furnished to Mr. Linforth for the making of that model, didn't you?

A. Yes, but we never furnished him with any notes for the making of that model.

Q. When did you furnish notes of this raise to the Elm Orlu Company?

A. They always had access——

Q. Just answer the question?

A. I did not furnish them with any notes.

Q. Or surveys?

A. I never gave them any surveys for any model. They came and got them from our office.

Q. They procured them; they took all the surveys of your workings from you?

A. They came into our office and had access to our maps and records, and this book also, at any time, as we had access to theirs.

1797 Redirect examination.

By Mr. Kremer:

Q. You have the book now in your possession containing the sections showing these raises?

A. I have.

Q. Have you any distinct recollection of having submitted that book to any surveyor or representative of the plaintiffs in this case?

A. I have.

Q. When?

A. About the first of October of this year.

Q. To whom did you submit it, and under what conditions or circumstances?

A. Mr. Passmore, engineer for the Clark interests, came up there to the office with a list of raises that he wished to get, and other things, raises, stopes, drifts and crosscuts. I looked at the list, and gave him this book and told him that everything he wished that we

had in the way of cross sections would be in this book, and he had access to the book and used it, and left it there.

Recross-examination.

By Mr. Gray:

Q. This was not one of the raises he wanted?
A. I did not look through the list.
By Mr. Dickson: You were requested by the court or permitted by the court when you left the stand before to make on a larger scale, 40 feet to the inch, a copy or tracing of exhibit 117,
1798 118 and 119; have you completed those?
A. Yes, sir; I left them on this desk right after completion. They are here; the tracings accompany the originals and are joined to them.
Q. The tracing is on a scale of 40 feet to the inch?
A. Yes, sir.
Q. The same as the maps?
A. Yes, sir.

(Tracings admitted in evidence without objection marked Defendant's Exhibits Nos. 117-B, 118-B and 119-B.)

(Witness excused.)

Defendants rest.

Thereupon, upon request of all counsel, the Court consented to visit the mines at a later date. The Court later visited the mines, accompanied by Plaintiffs' witness, H. V. Winchell, and by Defendant's witness, John D. Finch.

(Testimony closed.)

Thereafter an interlocutory decree was entered, as appears from the record in said cause, wherein an accounting was ordered, and thereafter proceedings were had before the court in the nature of the taking of testimony with a view to ascertaining the amount to be awarded upon said accounting, and at said proceedings the
1799 plaintiffs made the following offer of proof:

Mr. Gray: I am going to make an offer of proof. This testimony, I think, concludes the testimony, save the contract with reference to the ore west of the 301 foot plane. While Mr. Greene is on the stand, I desire to ask him if he has computed the amount of ore taken below the 1100 foot level of the Black Rock prior to the time of the commencement of this action, and east of the 301 foot plane and west of a parallel plane drawn through the top of the Pyle raise.

Mr. Dickson: We object to it as irrelevant and immaterial. They have shown no title to any of those ores.

The Court: Yes. The most you have shown is the point of connection at the 1100 of the Black Rock in the Pyle and the Rainbow main vein. I cannot see that to show what ore was taken below the 1100 by the Black Rock would avail you anything, because that includes everything west to the 301 foot point. No union of veins is shown nor anything; in fact, the court has refused to draw the inference heretofore. Objection sustained.

Exception noted by plaintiffs.

Mr. Gray: The report of the Butte and Superior for 1913, did I introduce that?

The Court: This ruling is not prejudicial to your argument that that vein runs through to the Pyle raise or the Pyle strand—
1800 the Pyle strand, nor do I say that the court will so find. In fact, that is to be yet determined. In any event you have shown no union, or evidence to warrant any recovery below the union.

Thereafter the court found that plaintiffs were entitled to recover of and from the defendant the sum of $177,704.40 with interest thereon from and after the 1st day of June, 1916, at the rate of 8% per annum, and the said court, in its decree, made and entered on the 6th day of July, 1916, decreed among other things that the said plaintiffs recover said sum of and from the defendant, and the said court entered its said decree as shown by the record herein.

1801 In the District Court of the United States for the District of Montana.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Plaintiffs,

vs.

BUTTE AND SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Defendant.

Stipulation.

It is hereby stipulated and agreed by and between the parties hereto that all of the exhibits in said case may in their original form be considered a part of the statement of the evidence and the proceedings of the court to be settled by the judge of the above entitled court and that all of the said exhibits of whatever kind and character may in their original form be certified by the clerk of the above entitled court to the clerk of the Circuit Court of Appeals of the United States, for the Ninth Circuit, as a part of the
1802 record on appeal in the above styled action, said exhibits to be considered by the Circuit Court of Appeals, for the Ninth

Circuit, aforesaid, in the consideration of the appeal in the above styled action.

Dated this 23rd day of December, 1916.

GEORGE F. SHELTON,
MYRON A. FOLSOM,
JOHN P. GRAY,
W. A. CLARK, JR.,
J. L. TEMPLEMAN,
Solicitors for Plaintiffs.
W. H. DICKSON,
A. C. ELLIS,
RUSSELL G. SCHULDER,
J. BRUCE KREMER,
L. P. SAUNDERS,
ALF C. KREMER,
WM. SCALLON,
Solicitors for Defendant.

The foregoing statement of evidence and proceedings in the above cause named in the caption is in due time presented to the judge of this court, and is approved by the judge aforesaid as true, complete and properly prepared, the said parties having stipulated that the record be prepared in question and answer form and that the
1803 court approve the same and it appearing to the court that the nature of the case is such that it is proper that the record be prepared in question and answer form. And it is further ordered that all exhibits referred to in said statement shall be deemed a part thereof, the same as if fully set forth therein.

GEO. M. BOURQUIN, *Judge.*

1804 UNITED STATES OF AMERICA,
District of Montana,
County of Silver Bow, ss:

I, George W. Sproule, Clerk of the District Court of the United States, for the District of Montana, do certify and return to the honorable, the United States Circuit Court of Appeals, for the Ninth Circuit, that the foregoing record, consisting of 1803 pages, numbered consecutively from 1 to 1803, is a true and correct transcript of the pleadings, findings and conclusions of the court, decree, opinion of the court, statement of evidence and proceedings, stipulations and records therein, certificate of approval and other proceedings had in said cause and of the whole thereof, as appears from the original records filed in said court in my possession, the same being made up in accordance with the Præcipe heretofore delivered to me. And I do further certify and return that I have annexed to said transcript and included within said paging the original citation. I further certify that all exhibits have been and are herewith certified by me to be produced in court in accordance with the stipulation between the parties. I further certify that the cost of the transcript of the record amounts to the sum of $724.65, and that the same has been paid by the appellant.

1805 In witness whereof, I have hereunto set my hand and affixed the seal of said court, at Butte, in the District of Montana, this 12th day of February, in the year of our Lord nineteen hundred and seventeen, and of the Independence of the United States, the one hundred and forty-first.

[COURT SEAL.]

GEO. W. SPROULE,
Clerk of the District Court of the United States for the District of Montana.
By HARRY H. WALKER,
Deputy Clerk.

1806 United States Circuit Court of Appeals for the Ninth Circuit.

No. 2939.

BUTTE & SUPERIOR COPPER COMPANY, LIMITED, a Corporation, etc., Appellant,

vs.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees.

Order that Portion of Opinion of Bourquin, J., be Printed as a Part of Record on Appeal.

On consideration of the stipulation of counsel for the respective parties and good cause therefor appearing,—

It is ordered that that certain portion of the opinion of the District Court of the United States for the District of Montana and the stipulation of counsel hereto annexed be filed and printed as a part of the record on appeal in the above-entitled cause.

WM. W. MORROW,
United States Circuit Judge and Judge of the United States Circuit Court of Appeals for the Ninth Circuit.

Dated: San Francisco, California, September 17, 1917.

1807 United States Circuit Court of Appeals for the Ninth Circuit.

No. 2939.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees,

vs.

BUTTE & SUPERIOR COPPER COMPANY, LIMITED, a Corporation, etc., Appellant.

Stipulation that Portion of Opinion of Bourquin, J., be Printed as a Part of Record on Appeal.

Whereas, a portion of the opinion of the District Court of the United States for the District of Montana of this case appears of record, it is stipulated that the remainder thereof, a copy of which is hereto attached, may be printed as a part of the record on appeal and when so printed may be filed as a part of said record.

Dated this 11th day of September, 1917.

M. A. FOLSOM,
JOHN L. TEMPLEMAN,
W. A. CLARK, JR.,
GEO. F. SHELTON, AND
JOHN P. GRAY,
Solicitors for Appellees.
W. H. DICKSON,
WM. SCALLON,
J. BRUCE KREMER,
L. P. SANDERS,
ALF C. KREMER,
Solicitors for Appellant.

1808 *Portion of Opinion of Bourquin, J.*

Upon accounting had, defendant waived in respect to its ores taken by plaintiff. It appears defendant's taking of plaintiff's ores was continuous from March, 1910, to May, 1913, both inclusive. The place was the Blackrock 1,200, between the Blackrock west end, and the 301 plane established at the Rainbow apex crossing of the common side line, and from said vein where bisected on strike by said side line. In 1910 there were no workings above that point that served to determine what vein (and where was its apex) was being mined by defendant.

Plaintiff having access at all times to defendant's workings with its consent, in June, 1910, observed defendant was taking said ores from beneath the Elm Orlu, and claimed a trespass. Later inspection disclosed like taking by defendant from beneath the Blackrock. At some time subsequent to March, 1910, plaintiff took some of de-

fendant's ores from the same vein beneath the Blackrock. A controversy arose in respect to all said ores and more, and was the subject of discussions, negotiations, understandings, and agreements, between the parties. In March, 1912, they agreed that "to facilitate the settlement of the controversy as to the ownership of said ores and ore bodies from which ore has been extracted, if any, by either of the parties hereto, and provide a reasonable length of time within which the parties may negotiate, * * * and endeavor to
1809 complete a settlement as to the ownership" of "ores heretofore extracted, * * * and which may hereafter be extracted," and of ore bodies, they would for three years waive the plea of limitations in any suits involving said ores and ore bodies. In July, 1912, "to afford both * * * ample opportunity of determining the disputed matter to the satisfaction of both," and without waiver of rights or acknowledgment of claims, they agreed upon certain areas within which neither would extract ores until by exploration work they might determine the location, extension and apices of the ore bodies "as soon as we can conveniently do so," both privileged to do development work and to inspect therein, and that a record of the tonnage of all ores extracted and the assay values thereof shall be kept by both companies for the purpose of accounting for the same after the ownership of such ores shall have been determined."

Later in the same month, to determine the location, position, and apices of the vein and ore bodies and to facilitate the settlement of the disputes, they agreed that each with diligence would do certain development for and at the expense of the other. Development work progressed, and in July, 1914, so far determined "the disputed matter to the satisfaction" of plaintiff, but not defendant, that plaintiff commenced this suit. The next month, in lieu of injunction pendente lite, for economic reasons, and not by way of limiting rights or admitting claims, they agreed upon areas wherein neither
1810 would mine, and areas wherein each might mine to the exclusion of the other, expressly stipulating that each was given the right pending suit to mine ore bodies claimed by the other, each to keep account of ore mined and places where, to be furnished the other on request, that the agreement would endure until decree herein, and that prior understandings and agreements in reference to reciprocal development work would continue.

Neither party demanded accounting to suit, and each demands it from the other, in the pleadings herein. During the accounting and now it is plaintiff's contention that, in so far as the ores are concerned, the suit is for damages for conversion of personal property. Defendant urges that it is for accounting in equity for the value of portions of realty severed and removed. This is material, in that by reason of the advance in the price of zinc, due to the war, the award to plaintiff might be about 1,000 per cent greater under its theory than under defendant's. The decision heretofore is not accurate in its characterization of the suit. Both parties alleged ownership, unfounded adverse claims beclouding title, underground trespasses and removal of ores (secretly and willfully, plaintiff alleges; wrong-

fully, defendant alleges); that the amount and value of such ores can be ascertained only by discovery and accounting; and that the adversary threatens to and will, unless restrained by the court, remove and convert all ores, or the value thereof, inflicting irreparable damage. The prayers are to quiet title, to enjoin assertions
1811 of adverse claims, to enjoin further entry and mining and taking ores, that the adversary "be required to account for all ores" taken, and the complainant have "decree for the value" of such ores wrongfully taken, and for other and further relief. The suit, in so far as the ores are concerned, is not for damages eo nomine, but for accounting for the value of ores taken. Neither in form nor theory is it for damages for conversion of ores as personal property. And plaintiff, having elected its remedy, cannot now, dazzled by the possibilities perceived in the subsequent spectacular rise of zinc, choose another, that does violence to its bill of complaint.

Furthermore, it is doubtful if conversion of ores is made out. Certainly it is not in respect to those taken subsequent to the agreement of July, 1912—a compromise agreement. When disputed property is in part taken by both claimants under an agreement that, when ownership is determined "to the satisfaction of both," an accounting and settlement will be had, the taking is not conversion; it sounds in contract, is lawful, resembles mutuum of Roman law, in legal contemplation is a sale at common law, and the only remedy is to determine ownership and compel the promised arcounting. The conduct of the parties and all other evidence are persuasive that the difficulties in the way of a determination of ownership of the ores induced an understanding for mutual advantage, labor and aid to that end, pending which both might mine some of the ores, dispose of them with other of their own, and, ownership determined, accounting would be had in respect to all ores taken whether
1812 before or after the agreement of July, 1912, a balance struck and paid. The stipulation in said agreement that it was without waiver of rights and without acknowledgment of claims cannot refer to taking and accounting for ores as therein agreed, and seems of superfluous precautionary words relating to the disputed ownership and not to remedies. As this view has not been urged, and is unnecessary to the decision, it may be left here.

In deference to the argument herein it may be observed that though in equity relief is limited to compensation, and damages in the sense understood at law are not determined and allowed, save where a court sitting in equity is so authorized by some statute (see Root v. Railway Co., 105 U. S. 215, 26 L. Ed. 975; 2 Dan. Ch. 1080), yet in view of the duty to herein administer local law (see Railway Co. v. Telegraph Co., 234 U. S. 376, 34 Sup. Ct. 810, 58 L. Ed. 1356; Trust Co. v. Krumseig, 172 U. S. 358, 19 Sup. Ct. 179, 43 L. Ed. 474), no reason is perceived why the local statute authorizing the injured party to elect the highest value between conversion and decision, creating a substantive right, should not be applied herein, had conversion been counted on and maintained.

The ores taken by defendant aggregate 31,825 tons. Plaintiff

admits those taken from beneath the Blackrock were taken in honest belief that defendant owned them, but contends otherwise in respect to those from beneath the Elm Orlu. This contention is
1813 founded upon the presumption that ores beneath a claim are presumed to be of that claim, in the absence of proof that they are in a vein apexing without it. In the face of the admission the contention fails. At the time when taken the ores were known to be of a single vein and at places where the same portion of the apex would control the ownership of all of them. Hence defendant, honestly believing it owned the ores beneath the Blackrock, obviously likewise believed it owned those beneath the Elm Orlu.

In accounting in equity for portions of realty served and appropriated under honest belief of ownership, no other injury appearing the award to the owner is the value in situ. This is arrived at in the case of ores by deducting the reasonable cost of mining and marketing or reducing to money, or what it cost the trespasser, if less, from the amount that ought reasonably to have been then received for or from them; the balance being their value in situ and the award to the owner. See Guffey v. Smith, 237 U. S. 101, 35 Sup. Ct. 526, 59 L. Ed. 856. In this case the ores contained 20.5 per cent zinc, 6 oz. silver, and 40 cents gold per ton. The parties are in accord that in the then state of the science of treatment of like ores, 65 per cent recovery and 48 per cent concentrates, was reasonably good practice. Plaintiff claims to have done better in treating like ores, and defendant slightly less in treating these ores. This reasonable result, in view of the law aforesaid, is the basis of recovery herein.

Defendant mined and milled the ores in connection with operations of which these ores were about 7.6 per cent. Allow-
1814 ances to defendants are, per ton of ore, $2.33 for mining, 17 cents for freight to mill, $1.19 for milling, and $2.06 for freight to the nearest purchasing smelter. For general expenses nothing is allowed, in that segregation is impossible, and nothing appears to show that defendant expended anything during the trespass that it otherwise would not. For instance, engineers, firemen, supervision, office help, shaft repairs, pumping, power, air, etc., were doubtless not appreciably increased. The theory of allowances is that the trespasser expended what the owner otherwise would have. But here, aside from direct mining and milling and freight, none such was expended.

To illustrate, the defendant's drifts and sill floors will not relieve plaintiff from duplicating them to reach the same place and mine the balance of the same ore body. No freight to mill can be allowed beyond what it would have cost plaintiff to transport the ores to its own mill. The suit is for compensation to plaintiff, not to defendant; otherwise, if defendant transported to mill so far that freight absorbed all profit, plaintiff would be without remedy. The price received for the concentrates from the smelter equaled 82 cents per ton crude for all metals save zinc, and $105,118 for the zinc therein. The zinc values are arrived at by computing the values of the ores mined in each month, at the average price of zinc when reaching market the succeeding month, at the rates then paid by the

smelter for concentrates of the recovery and grade aforesaid. Simple interest is awarded on all amounts thus found, from the date
1815 of sale to that of this decision. The total award is $177,707.40.

Plaintiff's claim for the values in the mill tailings which defendant did not have is disallowed Though valuable now, had they been saved, they added nothing to the value of the ores when taken. In the then experimental state of the science in respect to these ores, no buyer would have taken the possibilities of the tailings into account in fixing a purchase price for the ores, in so far as increased price is concerned.

In the matter of the decree the case was virtually reargued in relation to the Creden vein and Pyle strand. Both parties contend that definiteness requires that the Court fix where the Creden apex crosses the common side line. Plaintiff also contends that for the same reason the Court should find that the apex of the Pyle strand is in the Elm Orlu, at least as far east of the Rainbow as the Pyle raise, while defendant contends the finding should be that no part of the Pyle strand apex within the Elm Orlu extends farther east than the 301 plane. The findings heretofore made will stand.

A decree should be as definite as the case admits of, and it is believed that a decree conforming to the findings is sufficiently so herein. The evidence demonstrates that the Creden apex is in both Elm Orlu and Blackrock, but does not disclose the point where it crosses the common side line. The same may be true of the Pyle strand. A decree that each party is entitled to so much of said veins as lies within the determined end line planes projected where
1816 the apices cross the common side line, can be made certain by following the apices to the crossing.

True, the parties may later dispute the point of crossing, and so new litigation arise to identify, to determine it—the boundary line; but that is no more than is probable in respect to the Rainbow, the apex crossing of which is determined. At 100 places where the Rainbow dips beneath the claim not having the apex, what is the Rainbow, where is the bounding wall, what is ore in the Rainbow, and what adjacent but without it, may furnish the subject matter of a hundred suits. A decree may quiet title on a vein but partly developed, on presumptions, from end line to end line, which later may be found to cross side lines and between the same parties require new litigation to identify and fix the point of crossing. Other like situations may be conceived. The inherent nature of the property involved must be had in mind.

It must be noted the suit is not confined to specific ore bodies, but by defendant at least, by virtue of its claim of estoppel by deed, was broadened to involve every part of the Elm Orlu—every vein apexing in the Elm Orlu, unknown as well as known, that may dip beneath the Blackrock. Doubtless, too, are veins wholly unknown Orlu; that is, many veins the development of which is too slight to admit of definitely fixing where on strike they cross the Elm Orlu boundaries, or where they dip, as undoubtedly some of them do, beneath the Blackrock. Doubtless, too, are veins wholly unknown

in unexplored Elm Orlu territory. Is not plaintiff entitled to a decree quieting its title to all such veins in so far as their
1817 apices may be found to be within the Elm Orlu bounding planes fixed or projected, and that may be found to dip beneath the Blackrock? Is not such a decree sufficiently definite in view of the circumstances? It is believed the answer must be in the affrmative. And the decree will be as definite as the patent that conveyed such veins as a part of the Elm Orlu to plaintiff.

The Pyle strand undoubtedly apexes in the Elm Orlu, and since it unites with the Rainbow beneath the Blackrock at the 1,100, whereof the controlling portion of the apex is yet unknown, it may at depth further unite where the controlling apex will be found in the Elm Orlu; and a decree following the findings will protect the rights of both parties. Even as it is not known to what extent the Pyle dips beneath the Blackrock, it is not known to what extent the Rainbow east of the 301 plane dips beneath the Elm Orlu.

A decree conforming to the findings and quieting each party's title to all veins apexing in its claim, wherever they dip, would not be impaired, should deeper development disclose union of veins owned by them respectively. For at the union the junior location's vein would be at an end, and below would be only the senior location's vein. Some of the like difficulties attendant upon apex litigation are noted in Keely v. Mining Co., 169 Fed. 603, 95 C. C. A. 99.

Decree accordingly.

1818 [Endorsed:] No. 2939. United States Circuit Court of Appeals for the Ninth Circuit. Butte & Superior Copper Co., Limited, a Corporation, etc., vs. Clark-Montana Realty Company, a Corporation, and Elm Orlu Mining Company, a Corporation. Stipulation, Portion of Opinion U. S. District Court, and Order That Same be Filed, etc. Filed Sep. 17, 1917. F. D. Monckton, Clerk.

[Endorsed:] Printed Transcript of Record. Filed Feb. 21, 1917. F. D. Monckton, Clerk.

1818½ In the District Court of the United States for the District of Montana.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees,

vs.

BUTTE & SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Appellant.

Acknowledgment of Service.

Due service of the original transcript of record on appeal to the United States Circuit Court of Appeals for the Ninth Circuit, in the above entitled case, is acknowledged, and the receipt of three copies

of said transcript of record on appeal, at the time of the service of the original, is also acknowledged.

Dated this 12th day of February, 1917.

GEORGE F. SHELTON,
W. A. CLARK, JR.,
JOHN P. GRAY,
MYRON A. FOLSOM,
JOHN L. TEMPLEMAN,
Solicitors for Plaintiffs.

1819 United States Circuit Court of Appeals for the Ninth Circuit.

No. 2939.

BUTTE AND SUPERIOR MINING COMPANY, Designated as the Butte and Superior Copper Company, Limited, a Corporation, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees.

Upon Appeal from the United States District Court for the District of Montana.

Proceedings Had in the United States Circuit Court of Appeals for the Ninth Circuit.

1820 At a Stated Term, To wit, the October Term, A. D. 1917, of the United States Circuit Court of Appeals for the Ninth Circuit, Held in the Court-room Thereof, in the City and County of San Francisco, in the State of California, on Wednesday, the Tenth Day of October, in the Year of Our Lord One Thousand Nine Hundred and Seventeen.

Present: The Honorable William B. Gilbert, Senior Circuit Judge, Presiding; the Honorable William H. Hunt, Circuit Judge; the Honorable Charles E. Wolverton, District Judge.

No. 2939.

BUTTE AND SUPERIOR MINING COMPANY, a Corporation, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY et al., Appellees.

Order of Submission.

Ordered appeal in the above-entitled cause argued by Messrs. J. Bruce Kremer and W. H. Dickson counsel for the appellant, and

by Mr. John P. Gray, counsel for the appellees, and submitted to the Court for consideration and decision, with leave to counsel for the appellant to file a reply-brief.

1821 At a Stated Term, To wit, the October Term, A. D. 1917, of the United States Circuit Court of Appeals for the Ninth Circuit, Held in the Court-room thereof, in the City and County of San Francisco, in the State of California, on Monday, the Eighteenth Day of February, in the Year of Our Lord One Thousand Nine Hundred and Eighteen.

Present: The Honorable William B. Gilbert, Senior Circuit Judge, Presiding; the Honorable Erskine M. Ross, Circuit Judge; the Honorable William H. Hunt, Circuit Judge.

In the Matter of the Filing of Certain Opinions and of the Filing and Recording of Certain Judgments and Decrees.

By direction of the Honorable William B. Gilbert and William H. Hunt, Circuit Judges, and the Honorable Charles E. Wolverton, District Judge, before whom the cases were heard, Ordered that the typewritten opinion this day rendered by this Court in each of the following-entitled causes be forthwith filed by the Clerk, and that a Judgment or Decree be filed, and recorded in the Minutes of this Court in each of the causes in accordance with the opinion filed therein:

No. 2939.

BUTTE & SUPERIOR MINING COMPANY, etc., Appellant,

vs.

CLARK-MONTANA REALTY COMPANY et al., Appellees.

1822 United States Circuit Court of Appeals for the Ninth Circuit.

No. 2939.

BUTTE & SUPERIOR COPPER COMPANY, a Corporation, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees.

(*Opinion U. S. Circuit Court of Appeals.*)

W. H. Dickson, J. Bruce Kremer, A. C. Ellis, Jr., William Scallon, L. P. Sanders and Alf. C. Kremer, for the Appellant.

Myron A. Folsom, W. A. Clark, Jr., John L. Templeman, and John P. Gray, for the Appellees.

Before Gilbert and Hunt, Circuit Judges, and Wolverton, District Judge.

GILBERT, *Circuit Judge:*

The Clark-Montana Realty Company, hereinafter called the appellee, as the owner of the Elm Orlu Lode Mining Claim, together with the Elm Orlu Mining Company, its lessee, brought this suit against the appellant, the owner of the Black Rock Lode Mining Claim, to quiet title and to obtain an accounting for ores alleged to have been taken by the appellant from the appellee's mine.

1823 The court below, upon the issues and the testimony, found the following facts:

(1) That the Elm Orlu claim was located before the Black Rock claim was located.

(2) That the north wall of the Rainbow vein apex crosses the common side line between said claims 190 feet from the southwest corner of the Black Rock claim, and that the south wall of said vein apex so crosses 301 feet from said corner.

(3) That the Pyle strand of the Rainbow vein diverges from the south side of the latter vein in the Elm Orlu claim, and there and for some indefinite distance easterly has its apex in the Elm Orlu claim.

(4) That the Jersey Blue vein apexes in the Black Rock claim, does not unite with the Rainbow vein, and crosses on strike and dip the Rainbow vein, on strike east of the Rainbow apex crossing of the common side line.

(5) That the Creden vein diverges from the north side of the Rainbow vein in the Elm Orlu claim, and has its apex in both the Elm Orlu and Black Rock claims.

(6) That the apex of the easterly strand of the Rainbow vein in the Black Rock claim, terminates at a point within said claim east of the Elm Orlu east end line projected and about 250 feet west of the Black Rock east end line.

(7) That prior to the Black Rock location and patent entry, both the Rainbow vein and the Jersey Blue vein at their apices were discovered and known within the Black Rock claim and at their apices appeared as a continuous east-west vein.

1824 (8) That each party has mined the ore bodies of the other in the claims involved.

From the findings the court deduced the following conclusions of law:

(1) That plaintiff owns all ore bodies in the Rainbow vein between the Elm Orlu west end line and a parallel line projected from where the south wall apex of said vein crosses the common side line, or about 980 feet of said vein.

(2) That the defendant owns all ore bodies in the Rainbow vein between the projected Elm Orlu end line at the south wall apex crossing of the common side line by said vein and the east end line of the Black Rock claim, or about 1,200 feet of said vein.

(3) That plaintiff owns all ore bodies in the Pyle strand from its divergence at its west end from the Rainbow vein in the Elm Orlu claim easterly as far as the apex of said strand is within said claim, and between Elm Orlu end lines projected, and defendant owns all thereof east of the projected east end line last aforesaid.

(4) That defendant owns all ore bodies in the Jersey Blue vein between the points where the apex departs from defendant's premises across end lines as laid or projected, throughout depth save at its intersection or crossing of the Rainbow vein between Elm Orlu end lines as laid and projected.

(4-2) That plaintiff owns all ore bodies in the Creden vein from its divergence at its east end from the Rainbow vein westerly as far as the Creden apex is within the Elm Orlu claim between
1825 Elm Orlu end lines there projected, and defendant owns all thereof west of the projected west end line last aforesaid.

(5) That accounting in damages be had.

The appellant assigns error to the finding of the court below that the Elm Orlu claim was located before the Black Rock claim was located. If the Elm Orlu has priority, the appellee is entitled to all of the Rainbow vein lying between the westerly end line of that claim, and a line parallel thereto running south from a point on the north side of said claim 301 feet easterly from the southwest corner of the Black Rock claim, where as the court found, the foot wall of the Rainbow vein crosses the common side line, and is also entitled to all ores within the intersection spaces of that vein with the Jersey Blue vein and the Creden vein, but if the Black Rock has priority, then the eastern plane of the appellee's rights in the Rainbow vein would be upon a line parallel to the west line of the claim and running from a point on the north side of the claim 190 feet easterly from the southwest corner of the Black Rock claim, where as the court found, the northerly wall of the Rainbow crosses the common side line. Discovery and location was made of the Elm Orlu claim on April 18, 1875, and the declaratory statement of the locators was recorded on April 22, 1875, and continuous possession was had by the locators and their successors down to January 1, 1884, the date of the issuance of the patent, for which final entry had been made on February 20, 1882. The
1826 Black Rock claim was located November 6, 1875, and the declaratory statement was recorded a week later. Patent was issued on February 15, 1882, final entry having been made on November 24, 1880.

Notwithstanding that the location of the Elm Orlu was prior in time, the appellant contends that the respective mining rights of the parties hereto are fixed and determined by the dates of the issuance of the patents, and this for the reason that the locators of both the said lode claims failed to comply with the statute of Montana in force in the year 1875, which required that within 20 days after discovery the locator should file for record with the county recorder a declaratory statement in writing on oath before some person authorized by law to administer oaths, describing such location in the manner provided by the laws of the United States, the

Supreme Court of Montana having held that declaratory statements substantially in the form of those which were filed by the locators of these two mining claims were void. McBurney v. Berry, 5 Mont. 300; O'Donnell v. Glenn, 8 Mont. 248; Hickey v. Anaconda Copper Min. Co., 33 Mont. 46. It is true that the Montana courts so held, but in view of the harshness of the rule so established, the Legislature at its session next following the decision in the Hickey case enacted that the issuance of a patent for a mining claim shall be deemed conclusive that the requirements of the laws of the state relative to location and record have been duly complied with,
1827 and it validated all mining locations under the laws of the state "heretofore made that in any respect have failed to conform to the requirements of such laws, except as against one who has located the same ground in good faith and without notice." The court below declined to follow the rule of the Montana decisions, for the reason that the locations of the parties to the present suit had been made prior to the date of those decisions, and they were therefore not binding upon a Federal Court, and for the further reason that the Montana statute had not provided that failure to record a notice which complied in all respects with the statute of the territory should work a forfeiture of a claim, the court holding that the better rule has always been that if the recordation law does not expressly provide for a forfeiture for failure to record, the location is valid though not recorded, citing Last Chance M. Co. v. Bunker Hill & S. M. Co., 151 Fed. 586 and Yosemite Mining Co. v. Emerson, 208 U. S. 25. In so holding we think the court below committed no error. Vogel v. Warsing, 146 Fed. 949; Sturtevant v. Vogel, 167 Fed. 448. In the Yosemite case the question was whether a locator with knowledge of the existence of a mining claim could take advantage of the prior locator's failure to post two notices required by local rules, he having posted but one. The local rule provided for no forfeiture in case of failure to post two notices. The court said: "To hold that the want of notice under such circumstances would work a forfeiture would be to permit the rule to work gross
1828 injustice, and to subvert the very purpose for which it was enacted."

Again, we are of the opinion that if there was invalidity in the original certificate of location of the Elm Orlu lode claim, it was cured by the issuance of the patent. In Steele v. Smelting Co., 106 U. S. 447, referring to the powers and functions of the Land Department in issuing patents the court said: "Necessarily, therefore, it must consider and pass upon the qualifications of the applicant, the acts he has performed to secure the title, the nature of the land, and whether it is of the class which is open to sale. Its judgment upon these matters is that of a special tribunal, and is unassailable except by direct proceedings for its annulment or limitation." In Mining Co. v. Tunnel Co., 196 U. S. 337, the court, after enumerating the requisite steps for the location of a mining claim, such as discovery, marking the surface boundaries and filing a location certificate within a specified time as prescribed by the Colorado statutes, said that the issuance of a patent in Colorado for a lode claim "is therefore not only a conclusive adjudication of the fact

of the discovery of the mineral vein, but also of compliance with these several provisions of its statutes." In Lawson v. United States Mining Co., 207 U. S. 1, the locations had been made prior to the Act of July 26, 1866. The court, answering the contention that there was no evidence that the locations were made in conformity to the local customs or rules, said: "It is sufficient to say that by stipulation of counsel it was agreed that the patents * * *
1829 were issued upon the location notices. Inasmuch as they were accepted by the Government, and patents issued thereon, it was a recognition by the Department of the conformity of the proceedings to the local rules and customs of the district, and such ruling is not open to challenge by third parties claiming rights arising subsequently to such notices. * * * Acceptance by the Government of location proceedings had before the statute of 1866 and issue of a patent thereon is evidence that those location proceedings were in accordance with the rules and customs of the local mining district." So in El Paso Brick Co. v. McKnight, 233 U. S. 250, it was held that the entry of the local land officer issuing the final receipt to a locator is in the nature of a judgment in rem, and determines the validity of locations, completion of assessment work and absence of adverse claims. And in Stewart Mining Co. v. Bourne, 218 Fed 327, this court held that where a patent has been issued for a mining claim, a conclusive presumption arises that there is a discovery vein therein, that the claim was properly located thereon, and that all precedent acts necessary to authorize the issuance of the patent had been performed. The earlier decisions of the Supreme Court of Montana were in line with the cases above cited. Butte City Smoke-house Lode Cases, 6 Mont. 397; Talbott v. King, 6 Mont. 76; Chambers v. Jones, 17 Mont. 156. They were overruled, however, in Hickey v. Anaconda Copper Min. Co., 33 Mont. 46, the court there holding that if the declaratory statement was invalid, a location was not effected, and that in such a case there was no date to which the patent could relate antecedent to the
1830 date of the application therefor, which, the court said, was the first intimation to the Government that an attempt had been made to locate the claim. The court reasoned that if the locator did not proceed according to law, he initiated no right to which the patent could relate, and observed that of course the Government, being the owner, might issue patent upon the showing which Congress saw fit to exact. In brief, the court held that the issuance of the patent was an adjudication only of compliance with the laws of the United States, and not of compliance with the laws of the state. The case stands alone in so holding. The reverse was held, as we have seen, in Mining Co. v. Tunnel Co., supra.

We think also that any defect in the location of the Elm Orlu claim was cured by provisions of the Revised Codes of Montana of 1907. Section 2294 provides: "The issuance of United States patent for a mining claim shall be deemed conclusive that the requirements of the laws of this state relative to location and record of such mining claim have been duly complied with. Provided, however, that where questions of priority are involved, the date of the location shall be an issuable fact where it is claimed to have been prior

to the date of the record of the location." Section 2292 provides: "All mining locations made and recorded under the laws of this state heretofore in force, that in any respect have failed to conform to the requirements of such laws, shall nevertheless, in the absence of the rights of third persons accruing prior to the passage of this act, be valid, if the making and recording of such locations conform to the requirements of this act." It is urged against the effect of these statutes that they are not retroactive, since Section 6213 enacts that no part of the Revised Codes is retroactive unless so expressly declared. Section 2292 has this caption: "Validating Locations Heretofore Made." The appellant points to the fact that the caption to the section was inserted by the compiler of the Codes, and is of no avail as expressing the intention of the lawmakers. The Codes after they were framed were enacted, however, as the law of Montana, and even assuming that it was not the intention to make the caption to the section a part of the law, we think the language of the act itself is sufficient to express the intention of the Legislature to make it retroactive. It is expressly made applicable to mining locations that "have failed to conform" to the form and requirements of the laws "heretofore in force." Consolidated Min. Co. v. Struthers, 41 Mont. 565.

The appellant contends that priority was lost to the Elm Orlu for its failure to adverse the application for the Black Rock patent. At the time when the application for the Black Rock patent was filed, there was surface conflict between a portion of that claim and the Elm Orlu as those claims were marked upon the ground. The application for patent for the Black Rock claim embraced the conflict area, and patent was issued therefor. No adverse claim was filed by the owners of the Elm Orlu. In the application for the Black Rock patent the plat showed only the Black Rock claim and there was no reference to any conflict between that claim and the Elm Orlu, nor was mention made of the existence of the Elm Orlu claim. The applicants for the Black Rock patent were well aware of the Elm Orlu claim, and knew that it had been located at the time when they made their own location. The notice of intention to apply for patent stated that "the nearest claimants to these premises are claimants to Pollock lode on the southwest." At that time lessees were mining and shipping ore from the Elm Orlu. There was no fence or enclosure of any part of the Black Rock claim, and there was no controversy of any character between the claimants of the two claims. The adjudication of the Land Office was made solely upon the record which was before it, and nothing was determined by the issuance of the Black Rock patent further than the right of the patentees to the surface. Lawson v. United States Mining Co., 207 U. S. 1, affirming United States Min. Co. v. Lawson, 134 Fed. 769. The doctrine of the decision in the Lawson case is that an adjudication by the Land Office of the question of surface rights does not necessarily determine the question of underground rights, and that those rights not being subject to adverse claims, the failure to adverse does not estop the parties to litigate the question of priority. It is thus expressed in Kenney on The Law of the Apex, 233: "Where

the owner of two overlapping claims applies for a patent for one of them and gets it, the patent conclusively determines that the overlapping area was part of such claim at the time of the proceed-
1833 ings. But it does not necessarily determine that the patented claim was located first; and if it is shown that that question was put in issue and actually determined in the course of the patent proceedings, the owner of the other claim is not estopped from showing that his claim was really the first located, in a controversy that arises afterwards in regard to extralateral rights which were not, and could not have been determined in the course of the patent proceedings." The same view of the effect of the Lawson case is taken in Lindley on Mines, 3rd Ed., Sec. 742, and in Costigan on Mining Law, Page 396.

The appellant assigns error to the refusal of the court below to hold that the appellee is estopped by deed from asserting title to any vein or ores of the Elm Orlu claim which extend beneath the Black Rock surface. The deed so referred to is a quitclaim executed by the appellee on October 29, 1906, whereby it conveyed to one of the appellant's predecessors in interest, an undivided one-fourth interest in the Black Rock claim, and it is contended that thereby the appellee segregated from the Elm Orlu all mineral rights of that claim bounded by the vertical plane of its north side line, citing Montana Mining Co. v. St. Louis Mining & Milling Co., 204 U. S. 204. In the case so cited, in order to settle a dispute between two adjoining mining claims, the owners of one claim deeded to the owners of the other a portion of the former claim described by metes and bounds, "together with all the mineral therein contained." The court held that the effect of the conveyance was not simply to locate a boundary between two mining claims, leaving all surface rights to be
1834 determined by the ordinary rules, but that its effect was to convey all mineral below the granted surface, including a vein which apexed in unconveyed land of the grantor, and in so holding recognized the common law of Montana that a deed of real estate conveys all beneath the surface unless there be words of exception or limitation. Here there is no conveyance of a parcel of land described by metes and bounds, but a conveyance of an interest in a mining claim designated by its name. There is no reference in the deed or in the negotiations leading up to its execution to the fact that the grantor owned the adjoining Elm Orlu mining claim, and obviously there was no intention on the part of the grantor to convey, or upon the part of the grantee to acquire an interest in that claim. In fact, such intention is expressly negatived by the appellant's answer in the present case in which it denied that it claimed any estate or interest adverse to the appellant in or to the Elm Orlu claim, and expressly admitted that the appellee was the owner and in the possession of that claim. There are other circumstances connected with the transaction which might be adverted to, as showing that the intention of the parties was as we have above indicated, but we regard the proposition so plain as to require no discussion, that when the owner of two adjoining mining claims sells and conveys one of them,

he conveys only that which is granted by the Government when it issues the patent to that claim.

1835 There are several assignments of error to the findings of fact, the principal of which are that the court erred in finding that the Pyle strand of the Rainbow vein diverges from the south side of that vein in the Elm Orlu claim, and there and for some indefinite distance easterly has its apex in the Elm Orlu, and in finding that the apex of the easterly strand of the Rainbow vein in the Black Rock claim does not cross the easterly end of that claim, but terminates at a point within said claim, about 250 feet west of the east end line, and in finding that prior to the Black Rock location, both the Rainbow vein and the Jersey Blue vein at their apices were discovered and known within the Black Rock claim, and appeared as a continuous east-west vein. The appellant does not assert that the findings of fact are unsupported by competent evidence, but contends that they are contrary to the weight of the evidence. The trial court made its findings after an evidently careful and painstaking investigation of the testimony and the exhibits, and after a personal inspection of the mining properties. We have examined the record sufficiently to see that the findings are all supported by the credible testimony of reputable witnesses. Upon settled principles which this court has always recognized, findings so made upon conflicting testimony are conclusive upon this appeal.

The appellant contends that even though the conclusion is reached that the Elm Orlu claim has priority over the Black Rock, and that the appellee is not estopped by deed to assert title to any ore bodies beneath the surface of the Black Rock, still the

1836 court erred in denying to the appellant a decree quieting its title to the Jersey Blue vein through its entire depth, and its title to all ore bodies beneath the surface of the Black Rock claim easterly of a plane parallel to the west end line of the Elm Orlu drawn through a point on the northerly side line thereof 301 feet easterly of the southwest corner of the Black Rock claim, at which point the court found that the Rainbow vein on its foot wall side in its course departed from the Elm Orlu and entered the Black Rock, and this because there was utter failure of proof on the part of the appellee to establish its contention that easterly of such plane there was found within the Elm Orlu claim the apex of any vein or branch of a vein which on its downward course united either with the Jersey Blue vein or with that part of the Rainbow vein, the top of which is conceded to be within the boundaries of the Black Rock extended downward vertically. The contention involves the assumption that the burden was upon the appellee to prove that there was union upon dip between the Rainbow and the Pyle veins, and the fact that the court failed to fix the point of departure of the apex of the Pyle vein from the Elm Orlu claim. It is true that the court did not determine, but expressly reserved the question of the point where the apex of the Pyle vein passed out of the Elm Orlu. The evidence was not sufficient to justify a decision of that question. The burden was upon the appellant to show that the apex of the Pyle vein passed through the common side line. Its expert witnesses expressed

the opinion that it was possible that it did. One of them
1837 said that of two possibilities it was "probably the most probable one." The court below was of the opinion that the proof was clear that the Pyle vein apexed in the Elm Orlu, dipped beneath the Black Rock, and on strike and dip united with the Rainbow, and said: "Despite diligent, extensive and costly development work by both parties, the extent of all thereof was indefinite," and the court reached the conclusion that the appellee owned the Pyle strand or vein insofar as the apex is within the Elm Orlu, and that the appellee owned 980 feet of the Rainbow vein, and that if the veins unite on dip, the prior location owns all below, the appellee's being the prior location, and the court left to future development the question of how far the Pyle apex continued in the appellee's location, and to what extent beneath the Black Rock it united with the Rainbow in such position as to be controlled by the apex in the Elm Orlu. As to the Jersey Blue vein, one of the issues in the case was whether that vein unites with the Rainbow. It was not only proven, but it was admitted by the appellant, that the Rainbow vein from its apex in the Elm Orlu on its dip extends beneath the Black Rock, and that in said vein is the great ore body in dispute west of the apex crossing of the common side line under both claims, and that it extends downward to unknown depth. There was therefore imposed upon the appellant the burden of proving not only that its claim was prior to the Elm Orlu, but that the Jersey Blue vein unites with the Rainbow vein above any part of the ore body which the appellant claimed. This the appellant failed to show. The
1838 court was of the opinion that the alleged union of the veins was doubtful, and that the finding must be that they do not unite even though the evidence failed to indicate that they cross.

The court below properly declined to quiet title to claims resting on an undeveloped or possible junction at great depths beneath the claim. We think that the court had the power to make the decree which was made on the proven facts, and to leave to future development and proof other rights not yet made certain. Keely v. Ophir Hill Consol. Min. Co., 169 Fed. 601. In Union Pacific Ry. Co. v. Chicago &c. Ry. Co., 163 U. S. 564, 603, the court approved its decision in Joy v. St. Louis, 138 U. S. 1, where it had been said that it was not unusual for a court of equity to take supplemental proceedings to carry out its decree and make it effective under altered circumstances.

The decree is affirmed.

[Endorsed:] Opinion. Filed Feb. 18, 1918. F. D. Monckton, Clerk, by Paul P. O'Brien, Deputy Clerk.

1839 *Decree.*

United States Circuit Court of Appeals for the Ninth Circuit.

BUTTE AND SUPERIOR MINING COMPANY, Designated as the Butte and Superior Copper Company, Limited, a Corporation, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees.

(Decree U. S. Circuit Court of Appeals.)

Appeal from the District Court of the United States for the District of Montana.

This cause came on to be heard on the Transcript of the Record from the District Court of the United States for the District of Montana, and was duly submitted:

On Consideration Whereof, It is now here ordered, adjudged, and decreed by this Court, that the decree of the said District Court in this cause be, and hereby is, affirmed with costs in favor of the appellees and against the appellant.

It is further ordered, adjudged and decreed by this Court, that the appellees recover against the appellant for their costs herein expended, and have execution therefor.

[Endorsed:] Decree. Filed and entered February 18, 1918. F. D. Monckton, Clerk, by Paul P. O'Brien, Deputy Clerk.

1840 In the United States Circuit Court of Appeals, Ninth Circuit.

No. 2939.

BUTTE & SUPERIOR COPPER COMPANY, a Corporation, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees.

Petition for Rehearing.

Comes now the appellant and respectfully petitions this Honorable Court for a rehearing in said cause on the questions of law and fact pertaining to the so-called "Pyle strand" or "Pyle vein," for the following reasons:

1. That it clearly appears from the record that there is not any evidence whatever to sustain the third finding of fact made by the

trial court, to-wit: "That the Pyle strand of the Rainbow vein diverges from the south side of the latter vein in the Elm Orlu claim and then and for some indefinite distance easterly has its
1841 apex in the Elm Orlu claim." Such was the contention of appellant on the former hearing, and not merely that such finding was contrary to the weight of the evidence as assumed or stated by this court in its opinion.

2. That this court, in holding that the burden was upon appellant to show that the Pyle branch on its course and at its apex crossed the common side line or boundary line between the properties of appellant and appellees, has announced a doctrine which we respectfully submit is contrary to the great weight of authority and in conflict with views expressed by the Supreme Court of the United States in more than one case.

In order that we may not trespass unduly upon your Honors' attention, we will discuss these propositions as briefly as possible.

I.

In the opinion of this Honorable Court, at page 14 thereof, it is said:

"There are several assignments of error to the findings of fact, the principal of which are that the court erred in finding that the Pyle strand of the Rainbow vein diverges from the south side of that vein in the Elm Orlu claim, and there and for some indefinite distance easterly has its apex in the Elm Orlu. * * * The appellant does not assert that the findings of fact are unsupported by competent evidence, but contends that they are contrary
1842 to the weight of the evidence,"

from which it is apparent that this court was under a misapprehension respecting appellant's contention. Throughout, our contention has been that there was no evidence to support this finding. Whether such contention is or is not well founded can only be determined, of course, by an examination of all the evidence in the record relating to the top or apex of the Pyle vein.

In our original brief, at pages 114 to 135, inclusive, we set forth what we there claimed to be the substance of all of the evidence on behalf of the appellees touching this question. Appellees do not in their brief, nor in oral argument did they, call attention to any other evidence bearing upon the question. After setting forth this evidence, we said at page 136:

"The foregoing embraces the substance of all of the testimony on behalf of appellees touching this question. In it there is found nothing which lends any support to the court's third finding of fact, namely, 'that the Pyle strand of the Rainbow vein diverges from the south side of the latter vein in the Elm Orlu claim and there and for some indefinite distance easterly has its apex in the Elm Orlu claim.'"

And in our reply brief, page 32, we said:

"Not a single witness claimed that he had observed or been able to discover the top or apex of what he believed to be the top
1843 or apex of the Pyle vein elsewhere than in the Pyle raise. Neither did any witness testify that he had observed or been able to discover where the Pyle branch at its top or apex diverged from the Rainbow on its south side or elsewhere."

And at pages 34-5, we said:

"Moreover, in the case now before the Court the finding under discussion is not based upon conflicting evidence, but is one which finds no support whatever in the testimony."

And we now confidently assert that the most careful scrutiny of the record will fail to disclose or discover any testimony given by any witness that he had anywhere observed or been able to discover where the Pyle vein at its apex diverged from the main Rainbow lode within the Elm Orlu claim. At no place within that claim did any witness claim that he had found the top or apex of what he believed to be or regarded as the top or apex of the Pyle strand anywhere within the Elm Orlu claim, except in the Pyle raise near the 500 level of the Elm Orlu; and as to that particular place, while Mr. Searles and Mr. Winchell, witnesses for appellees, each gives it as his opinion that the top or apex of the vein was there found; yet, the last named gentleman, as shown in our original brief, page 133, in reply to a question by the court, stated that the Pyle strand where cut off by the fault is small, that the fissure may pos-
1844 sibly exist above it, yet he could not find it in the workings above, and if it were above, it would be offset slightly to the south and continue on upward in that position, that the fault is not one of apparent great displacement.

While Professor Irving, witness for appellees, as pointed out in our opening brief, pages 121-2, testifies that as far as he knows it, meaning the Pyle vein, may continue upward, and that he cannot say where, in its upward continuation, it would go.

And Mr. Weed, another of their witnesses, as shown in our opening brief, pages 124-5, testified (referring to the Pyle raise just below the 500 level of the Elm Orlu) that there is there a small clay slip which might or might not cut off the Pyle branch of the Rainbow lode, but that in his judgment it was cut off and displaced somewhat there. That he believes that the vein could be traced further upward, but how far, he does not know.

And Mr. Green, the other of appellees' witnesses on his question, as pointed out in our opening brief, page 116, referring to the Clark cross-cut (Plaintiff's map, Exhibit 8), states that it was driven south to pick up the Pyle strand of the Rainbow lode, that he does not know whether that strand is found in that crosscut or not,—he could not identify it. (This crosscut, of course, is at a much higher elevation than the top of the Pyle raise.)

(Witnesses for appellant, Wiley and Burch, each gave it as his opinion that the top of the Pyle strand was not found in this raise, but continued upward.) The trial court concluded that it

1845 could not be determined from the evidence whether the top of the Pyle strand was there found or not. This is apparent from its opinion, Rec. p. 82, from which we quote as follows:

"Three hundred and fifty feet above the raise, the country has been thoroughly cross-cut by the Clark Tunnel and connected workings, in which are slips, seams and more than fifteen small veins, some in each claim" (meaning the Elm Orlu and Black Rock claims), "some of those in one claim as reasonably to be correlated with the Pyle as those in the other. These premises are filled with slips, gouges, seams, veinlets and veins, and will not permit correlation nor projection of small features like the Pyle at the Elm Orlu 500, save for slight distances. Plaintiff's witnesses are in doubt whether the Pyle ends in the raise or continues to surface. Defendant's witnesses incline to the opinion it continues upward; that the southerly-dipping slip in the raise is the Pyle fissure and should apex in the Blackrock. This slip, if the Pyle fissure, may contain ore above, though mineralization ceased in the raise, and have its apex in some indefinite place above."

In appellees' brief, page 60, it is said that appellant's witnesses gave it as their opinion that it was possible that the Pyle
1846 branch at its apex departed from the side line of the Elm Orlu, and referred, in support of the statement, to the testimony of Mr. Burch at page 1409.

And in the opinion of this Honorable Court, it is said that appellant's expert witnesses expressed the opinion that it was possible that the Pyle vein at its apex crossed the common side line and that one of them said that of two possibilities, "it was probably the most probable one."

This statement so found in appellees' brief, is erroneous, as is also the above statement of this Honorable Court. Appellant's witnesses being of the opinion that the top of the Pyle branch was not found in the Elm Orlu claim and having so testified could not, without manifest self-contradiction, have stated that it was possible or probable that this vein in fact, at its apex crossed a side line of the Elm Orlu claim, not one of them said so.

Turning to page 1409 of the record referred to in appellees' brief and reading what is there said in connection with what is found on pages 1407-8, it appears that the witness Burch was speaking solely with reference to his attempted correlation of a vein in working four from the Clark tunnel with the Pyle branch found in the Pyle raise, when he said in answer to a question on cross-examination:

"I think that is one of the two possibilities, probably the most probable one."

(We have not overlooked the fact that appellees, at page 52 of their brief, say that there was competent and credible testi-
1847 mony in support of this third finding of fact and in that connection refer to the testimony of Irving, at p. 495, Searles, pp. 672-673, Weed, p. 564, and Winchell, pp. 802-807.)

Turning to the testimony of Professor Irving at pages 495-6, we find the following:

"Q. Where is the top of this Pyle strand as you have observed it; beneath the surface of what claim?

A. The top of the Pyle strand, as far upward as I have been able to observe it, is entirely with the Elm Orlu claim."

But it will be borne in mind, as heretofore pointed out, that Professor Irving, speaking of the vein in the Pyle raise near the 500 level of the Elm Orlu, testified on cross-examination that it might continue upward from where last seen in that raise; and that he gave no testimony respecting the top or apex of the Pyle vein elsewhere within the Elm Orlu claim.

Proceeding, witness testified:

"Q. Where can you see the Pyle strand united on strike with the main strand of the Rainbow?

A. That can be seen on the 1200 foot level of the Elm Orlu and on the 900 foot level of the Elm Orlu."

And then the witness, at page 496, points out in detail these points or places of union on strike. So that we see that the places where the witness testifies to a union on strike or a divergence of the Pyle branch from the main Rainbow is not at its top or apex, but
1848 from 900 to 1200 feet below the surface.

Turning to the testimony of Searles, pages 672-3 (referred to in appellees' brief), it will be observed that he there makes no reference to the divergence of the Pyle strand at its top or apex from the main Rainbow lode, but does say:

"* * * we know on the 800 and the 900 levels it does join with the Rainbow to the west."

Here, again, it will be borne in mind, as heretofore stated, that at no point in the Elm Orlu claim did this witness testify that he had found the top or apex or what he regarded as the top or apex of the Pyle strand, except in the Pyle raise.

Turning to the testimony of Mr. Weed, pages 563-4 (referred to in appellees' brief), we find that he testified as follows:

"Q. Now, then, that strand of the Rainbow upon its strike has been developed from what points to the west, the extreme development?

A. Well, shortly above the 1200 foot level of the Black Rock mine, and on the 1200 foot level of the Elm Orlu mine upward to a point——

Q. Well, I mean upon its strike?

A. From the point where it departs from the Rainbow lode on the 1200 of the Elm Orlu mine, eastward to the point where it unites again with the Rainbow lode, a point shown about the east
1849 end of the 1141 drift of the Black Rock mine and in the stopes beneath it.

Q. Where in your judgment is the top edge of this Pyle strand, beneath what claim?

A. The uppermost portion of the Pyle branch is beneath the Elm Orlu claim, within the Elm Orlu claim.

Q. You mean as far as developed?

A. As far as developed; or if this be as seems probable, the upper

portion of the Pyle strand or Pyle branch, as I prefer to call it, then it is all within the Elm Orlu claim.

Q. And that has been followed upward as you have described continuously from the stopes beneath the surface of the Black Rock claim?

A. It has."

He then proceeds to describe the vein as it is followed upward in the Pyle raise.

Here, again, it will be remembered that the only place where this witness gives any testimony respecting his observations of the Pyle vein at or near its top or apex was where it was found in the Pyle raise near the 500 level of the Elm Orlu. And on cross-examination he states, as shown in our opening brief, pp. 124-5, that he believed the vein could be traced further upward—how far, he did not know.

And turning to the testimony of Mr. Winchell, at pp. 802-807, referred to in appellees' brief, it will be found that he there makes no allusion whatever to a divergence of the Pyle strand at its
1850 top or apex from the Rainbow lode within the Elm Orlu claim. And the only place where this witness claimed that he had observed or discovered what in his opinion might be regarded as the top or apex of the Pyle strand was in the Pyle raise near the 500 level of the Elm Orlu.

Moreover, in this connection, it will be remembered that the trial court reached the conclusion (as is shown by the passage from its opinion above quoted) that it was as reasonable to conjecture that the Pyle vein, where disclosed in the Pyle raise near the 500 level, might have its top or apex in the Black Rock as in the Elm Orlu claim.")

II.

In a suit in which the plaintiff, being the owner of a mining claim, alleges in his complaint that within the boundaries of his claim there is a vein which on its course and at its top or apex traverses the claim from end to end; that such vein in its downward course, so far departs from the perpendicular as to pass beyond a side line of the claim into and beneath the surface of an adjoining patented claim owned by the defendant; that the defendant asserts an adverse claim to that part of the vein so found beneath the surface of his location and asks to have his title quieted as against this adverse claim of defendant: Upon which of the parties rests the burden of proof to establish not only the continuity of the vein in its downward course, but also the situs of its top or apex?

1851 Prior to the handing down of the opinion in this case, we had supposed, that beyond question, this burden rested upon the plaintiff—the party asserting the extralateral right; and that in so far as he might be unable to show by a preponderance of evidence that the apex of the vein was in fact within his claim, to the extent or for the length necessary to entitle him to his asserted extralateral right on the vein, it would be the plain duty of the court to enter a decree against him upon the merits. And such, we doubt not at all,

would have been the consensus of opinion of members of the Bar familiar with mining litigation. But we are now admonished by this court that if the Pyle vein does not continue within the boundaries of the Elm Orlu claim to and across the easterly end line thereof, but on its course and at its apex departs from that claim over the common side line between it and the Black Rock claim, the burden is upon the defendant to show such departure and the place thereof.

The importance of this ruling cannot well be exaggerated, for it is a matter of serious concern not only to the parties here litigant, but to the many owners of lode locations throughout the western country. In the case at bar, however erroneous this ruling may be, if not now corrected, it will become the law of the case, binding not only upon the trial court, but conclusive in this court upon any future appeal. If the lower court, on the trial of the issues tendered by the supplemental bill (which plaintiff has been permitted to file, being
1852 precisely the same issues which were tendered by the original bill), should be in doubt—the evidence being in equilibrium—whether the Pyle branch did have its apex in the Elm Orlu claim, or, if its apex were found at some place within the claim, should be in doubt as to whether it departed therefrom before the easterly end *lien* was reached, it would be constrained, under the opinion of this court as it now stands, to resolve that doubt against the defendant and to uphold the extralateral right of plaintiff's to the extreme limit claimed by them, namely, to a plane drawn vertically downward through the easterly end line of the Elm Orlu extended northerly indefinitely in its own direction, and to enter a decree accordingly, and this court, upon appeal therefrom, would be compelled to affirm the decree in that regard.

It is, of course, no longer open to controversy that the owner of a mining claim is presumed to be the owner of all ore bodies found beneath the surface thereof. We need only cite.

St. Louis Mining & Milling Co. et al. vs. Montana Mining Co. Ltd., 194 U. S. 235, 238-9;

Mammoth Mining Co. vs. Grand Central Mining Co., 213 U. S., 72, 73.

This presumption, we respectfully submit, must prevail until it is shown by a preponderance of the evidence that such ore bodies belong to and are a part of a vein which has its top or apex in a claim owned by the plaintiff, and that his claim is so laid upon the
1853 apex thereof as to entitle him to follow the same in its downward course extralaterally between bounding planes which would embrace the ores in controversy.

Plaintiff, in a suit to quiet title, alleges in his bill that he is the owner and in possession of a lode mining claim (describing the same) and of all ore bodies found beneath the surface thereof; that defendant asserts an adverse estate or interest in and to such ore bodies; that such asserted adverse claim is false and unfounded, and prays the appropriate relief. Defendant files his answer, in which

he admits that he asserts ownership of these ore bodies. It is clear, we take it, that at the trial all that would be incumbent upon the plaintiff to do in order to make out a prima facie case, would be to make proof of his title and possession to the claim, and the existence of ore bodies beneath the surface thereof. If, now, the defendant base his defense upon the ground that the ore bodies so found beneath the surface of plaintiff's claim belong to and are part of a vein which has its top or apex within a claim owned by defendant, unquestionably, it would seem the burden of proving this alleged fact would rest upon him; neither would it be sufficient for him to show merely that somewhere within this claim the top or apex of the vein was found. To establish any defense he would be compelled to go further and show by a preponderance of the evidence that this vein at its apex so traversed his claim as to entitle him to extralateral rights thereon between bounding planes which would include the
1854 ore bodies beneath plaintiff's claim, or, at least, some definite part or portion thereof.

The owner of a mining claim can have no greater length upon a vein extralaterally, at depth, than the length along the top or apex thereof, which is covered by his location.

In Consolidated Wyoming Gold Mining Co. vs. Champion Mining Company, 63 Fed. Rep., p. 540, Hawley, Judge, delivering the opinion, says, at pages 550-551:

"What are the rights of complainant, under and by virtue of its patent to the Ural ground, to the southerly part of the Wyoming or slate vein after it crosses the southerly end line of the Wyoming location? * * * the complainant is the owner of so much of the slate or Wyoming vein as has its apex within the surface of the Ural location. But here we are met with the difficulty of determining from the evidence how far the apex of this vein is shown in the Ural claim after leaving the south end line of the Wyoming surface location. This is the most difficult and doubtful question of fact that is presented to the court for its determination. The testimony as to the existence of the slate vein to certain points southerly, near the mouth of the Wyoming shaft, may be said to be fairly established by the evidence. South of that point to the southerly end of the Ural it is not well defined, and is not clearly proven.
1855 The court is left in doubt as to the truth. The impression received from an examination of the record might be said to be that the probabilities are in favor of that vein extending through the Ural ground, as claimed by complainant. But the court is not prepared to say that the fact of its existence to that extent has been proven to its satisfaction; and this should be clearly shown before the court would be justified in giving to complainant the right to follow underneath within the surface lines of the New Year's and New Year's Extension claims, belonging to respondent. The respondent has the undoubted right to say to complainant, 'Hands off of any and everything within my surface lines extending vertically downward, until you prove that you are working upon and following a vein which has its apex within your surface claim, of which you are the owner.' "

To like effect is the decision of the Supreme Court of Utah in the case of Grand Central Mining Company vs. Mammoth Mining Co., cited and quoted from in appellant's reply brief, pp. 38-41. That case was carried to the Supreme Court of the United States on writ of error and will be found reported in 213 U. S., p. 72.

To the same effect, also, is the case of Hyman vs. Wheeler, 29 Fed. 347, cited and quoted from in our reply brief, p. 38.

1856 In the Consolidated Wyoming Co. case, supra, Hawley, at pp. 548-9, says:

"* * * The statute should be so construed as to give to the locator what he actually locates; no more and no less. It should be liberally construed in his favor, so as to give him the full benefit of the statute in its true spirit and intent, in order to carry out the wise and beneficent policy of the general government in opening up the mineral lands for exploration and development. * * * He is admonished by the law that he will be limited in the length of his lode upon its strike to such portion as is within the surface lines of his location, but he is at the same time assured that he will not be limited or deprived of his extralateral rights as to the depth of such lode, upon its dip, the apex of which is within the surface lines of his location. * * * One general principle should pervade and control the various conditions found to exist in different locations, and its guiding star should be to preserve in all cases the essential right given by the statute to follow the lode upon its dip, as well as upon the strike, to so much thereof as its apex is found within the surface lines of the location."

1857 In Tyler Mining Co. vs. Last Chance Mining Co., 71 Fed. 848, Beatty, Judge, delivering the opinion of the court, says, at p. 851:

"* * * Upon the fact that an apex is within his surface lines, all his underground rights are based. When, then, he owns an apex, whether it extends through the entire or through but a part of his location, it should follow that he owns an equal length of the ledge to its utmost depth. These are the important rights granted by the law."

That case is cited and quoted from with approval by the Supreme Court of the United States in the Del Monte case, 171 U. S., p. 91.

In Lawson vs. United States Mining Co., 207 U. S., p. 1, the court, at p. 8, says:

"Title by patent from the United States to a tract of ground theretofore public, prima facie carries ownership of all beneath the surface, and possession under such patent of the surface is presumptively possession of all beneath the surface. This is the general law of real estate. True, in respect to mining property this presumption of title to mineral beneath the surface may be overthrown by proof that such mineral is part of the vein apexing in a claim belonging to some other party. But this is a matter of defense, and while proof of ownership of the apex may be proof of the ownership of the vein descending on its dip below the surface of property

1858 belonging to another, yet such ownership of the apex must first be established before any extralateral right to the vein can be recognized."

See also, Keely vs. Ophir Hill Con. Mining Co., 169 Fed. 601, where, at p. 603, it is said:

"* * * Presumptively the owner of the surface of a mining claim owns all minerals beneath it. This presumption ceases when it is made to appear that some vein found underneath the surface has its apex in a claim belonging to another; but the ownership of this apex vein and its dip and descent to and underneath another claim so as to overcome the presumptive ownership of it in the owner of the surface is a matter of proof, the burden of which rests upon him who asserts it."

See also Third Lindley, Sec. 780, pp. 1899, 1900.

Respectfully submitted,

W. H. DICKSON,
J. BRUCE KREMER,
A. C. ELLIS, JR.,
WILLIAM SCALLON,
L. P. SANDERS,
ALF. C. KREMER,
Solicitors for Appellant.

1859 W. H. Dickson, of counsel for the petitioner and appellant in the above entitled cause, does hereby certify that he believes error is found in the decision of this Honorable Court in said cause, that the foregoing petition for rehearing is, in his judgment, well founded, and that it is not interposed for delay.

W. H. DICKSON,
Of Counsel for Appellant and Petitioner.

Dated: Salt Lake City, Utah, March —, 1918.

[Endorsed:] Petition for Rehearing. Filed March 14, 1918. F. D. Monckton, Clerk.

1860 At a Stated Term, To wit, the October Term, A. D. 1917, of the United States Circuit Court of Appeals for the Ninth Circuit, Held in the Court-room Thereof, in the City and County of San Francisco, in the State of California, on Monday, the First Day of April, in the Year of Our Lord One Thousand Nine Hundred and Eighteen.

Present: The Honorable William W. Morrow, Circuit Judge, Presiding; the Honorable William H. Hunt, Circuit Judge.

No. 2939.

BUTTE & SUPERIOR MINING COMPANY, LTD., etc., Appellant,

vs.

CLARK-MONTANA REALTY COMPANY, et al., Appellees.

Order Denying Petition for Rehearing.

On consideration thereof, and by direction of the Honorable William B. Gilbert and William H. Hunt, Circuit Judges, and the Hon-

orable Charles E. Wolverton, District Judge, before whom the cause was heard, Ordered that the Petition, filed March 14, 1918, on behalf of the appellant for a rehearing of the above-entitled cause be, and hereby is denied.

1861 At a Stated Term, To wit, the October Term, A. D. 1917, of the United States Circuit Court of Appeals for the Ninth Circuit, Held in the Court-room Thereof, in the City and County of San Francisco, in the State of California, on Monday, the Fourth Day of March, in the Year of Our Lord One Thousand Nine Hundred and Eighteen.

Present: The Honorable William B. Gilbert, Senior Circuit Judge, Presiding; the Honorable Erskine M. Ross, Circuit Judge; the Honorable William H. Hunt, Circuit Judge.

No. 2939.

BUTTE & SUPERIOR MINING COMPANY, Designated as the Butte and Superior Copper Company, Limited, a Corporation, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees.

Order Staying Issuance of Mandate Under Rule 32 Until Petition to Supreme Court U. S. for Writ of Certiorari be Disposed of, on Condition, etc.

Upon motion of Mr. J. Bruce Kremer, counsel for the appellant, and on condition that the petition therefor be docketed in the Supreme Court of the United States on or before April 29, 1918, and agreeably to the rules of the said Supreme Court, it is ordered that the issuance of the Mandate under Rule 32 of this court in the above-entitled cause be, and hereby is, stayed until the Petition to be made on behalf of the appellant to the said Supreme Court for the issuance of a writ of certiorari herein be disposed of.

1862 United States Circuit Court of Appeals for the Ninth Circuit.

No. 2939.

BUTTE & SUPERIOR MINING COMPANY, Designated as the Butte and Superior Copper Company, Limited, a Corporation, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees.

Order Staying Issuance of Mandate Under Rule 32 Until Petition to Supreme Court U. S. for Writ of Certiorari be Disposed of, on Condition, etc.

Upon motion of Mr. Rufus Thayer, counsel for the appellant, and on condition that the petition therefor be docketed in the Supreme Court of the United States on or before May 29, 1918, and agreeably to the rules of the said Supreme Court, it is Ordered that the issuance of the Mandate under Rule 32 of this court in the above-entitled cause be and hereby is, stayed until the Petition to be made on behalf of the appellant to the said Supreme Court for the issuance of a writ of certiorari herein be disposed of.

WM. W. MORROW,
WM. H. HUNT,
United States Circuit Judges.

Dated: San Francisco, California, April 15, 1918.

[Endorsed:] Order Staying Issuance of Mandate. Filed April 15, 1918. F. D. Monckton, Clerk.

1863 *Telegram.*

San Francisco, California,
June 20, 1918.

Honorable William B. Gilbert, Circuit Judge, Portland, Oregon:

Case of Butte and Superior Copper Company against Clark Montana Realty Company et al. number twenty-nine thirty-nine petition for writ of Certiorari to Supreme Court has been denied and mandate due to issue today Stop Butte and Superior Copper Company appellant desires stay of Mandate for thirty days or until first Monday in July within which to present authorities and brief in support of its application for appeal which I discussed with you some weeks ago Stop We are convinced we can demonstrate to your satisfaction that a Federal question is involved Stop Inasmuch as mandate is due to issue today it is necessary that Clerk of Court be advised of stay of mandate immediately Stop Will you kindly telegraph me if this request can be granted.

RUFUS THAYER.

Telegram.

1918, Jun- 19, PM. 8 02.

A715PO 8 Coll.
Hoodriver Ore 745 P 19.
Rufus Thayer C 323
San Francisco Calif.

Our consent to the stay as requested.

WM. B. GILBERT.

[Endorsed:] Order staying issuance of Mandate until July 1, 1918. Filed Jun- 20, 1918. F. D. Monckton, Clerk.

1864 At a Stated Term, To wit, the October Term, A. D. 1917, of the United States Circuit Court of Appeals for the Ninth Circuit, Held in the Court-room Thereof, in the City and County of San Francisco, in the State of California, on Monday, the First Day of July, in the Year of Our Lord One Thousand Nine Hundred and Eighteen.

Present: The Honorable William H. Hunt, Circuit Judge, Presiding; The Honorable Maurice T. Dooling, District Judge.

No. 2939.

BUTTE AND SUPERIOR MINING COMPANY, Designated as Butte and Superior Copper Company, Ltd., a Corporation, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY, a Corporation, Appellees.

Order Staying Issuance of Mandate.

Upon Motion of Mr. Rufus Thayer, on behalf of counsel for the appellant, and good cause therefor appearing, ordered Mandate of this Court under Rule 32 in the above-entitled cause stayed for a period of thirty (30) days from date.

1865 United States Circuit Court of Appeals for the Ninth Circuit.

No. 2939.

BUTTE & SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees.

Petition for Allowance of Appeal.

To the Honorable Justices of the Supreme Court of the United States or to the Honorable Justices of the Circuit Court of Appeals for the Ninth Circuit:

The appellant, Butte & Superior Mining Company respectfully shows:

That the above entitled cause is now pending in the United States Circuit Court of Appeals for the Ninth Circuit, and that a judgment has been rendered therein on the 18th day of February, 1918, affirming the decree of the District Court of the United States, for the District of Montana, and that a petition for rehearing was denied therein on the 1st day of April, 1918; that the matter in controversy in said suit exceeds, $1,000.00 besides costs; that this case is one in which the Circuit Court of Appeals for the Ninth Circuit has not final
1866 jurisdiction and that it is a proper cause to be reviewed by the Supreme Court of the United States on appeal.

Wherefore, appellant prays that an appeal be allowed your petitioner directing the Clerk of the United States Circuit Court of Appeals for the Ninth Circuit to send the record and proceedings in said cause, with all things concerning the same, to the Supreme Court of the United States in order that the errors complained of in the assignment of errors herewith filed by the said appellant may be reviewed, and if error be found, corrected according to the laws and customs of the United States; and petition- further says *that* an order touching upon the security to be required in order to perfect the appeal be made.

W. H. DICKSON,
J. BRUCE KREMER,
WM. SCALLON,
RUFUS THAYER,
Solicitors for Appellant.

The foregoing petition is hereby granted and the appeal is allowed in the above entitled case to the Supreme Court of the United States upon the appellant filing a bond in the sum of — ($—) dollars, with sufficient surety or sureties, to be conditioned as required by law.

——— ———,
Judge of the United States Circut Court of Appeals for the Ninth Circuit.

[Endorsed:] Petition for Allowance of Appeal. Filed May 16, 1918. F. D. Monckton, Clerk.

1867 United States Circuit Court of Appeals for the Ninth Circuit.

No. 2939.

BUTTE & SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees.

Assignment of Errors.

Now comes the above-named appellant, Butte and Superior Copper Company, Limited, a corporation, and files the following assignment of errors upon which it will rely upon the prosecution of its appeal from the decree and decision made by this Honorable Court on the 18th day of February, 1918, in the above entitled cause:

I.

The said Circuit Court of Appeals erred in not reversing the decision and decree of the District Court of the United States for the District of Montana in this cause, and affirming the same.

II.

The said Circuit Court of Appeals erred in holding and deciding that the alleged location of the Elm Orlu Mining claim was
1868 valid.

III.

The said Circuit Court of Appeals erred in holding and deciding that the statutes of Montana relating to mining locations did not render the said location of the Elm Orlu invalid for failure to comply with the said statutes.

IV.

The said court erred in holding and deciding that the issuance of letters patent for the said Elm Orlu mining claim cured any defects in the location of the same and precluded any inquiry into its validity.

V.

The said court erred in holding and deciding that the Statutes of Montana of 1907 relating to mining locations cured the defects in the location of the said Elm Orlu mining claim.

VI.

The said court erred in holding and deciding that the burden of proof was upon the said appellant in the court below.

VII.

The said court erred in holding and deciding that the burden of proof was upon the appellant upon the trial in the court below to prove that it had the apex of the Rainbow vein and the point at which the same passed into the Black Rock claim.

VIII.

The said court erred in holding and deciding that the bur-
1869 den of proof was upon the appellant upon the trial in the court below to prove that the alleged apex of the alleged Pyle strand was in the Black Rock claim, or passed from the Elm Orlu into the Black Rock claim, and to show where it did so pass.

IX.

The said court erred in holding and deciding that the burden was upon the appellant to prove upon the trial in the court below that there was a junction between the vein designated as the Jersey Blue and the vein designated as the Rainbow.

X.

The said court erred in affirming the decision of the District Court of the United States for the District of Montana to the effect that the Elm Orlu claim was located before the Black Rock claim.

XI.

The Circuit Court of Appeals erred in affirming the decision of the District Court to the effect that the alleged Pyle strand of the Rainbow diverges from the south side of the latter vein in the Elm Orlu claim, and there and for some indefinite distance easterly has its apex in the Elm Orlu claim.

XII.

The Circuit Court of Appeals erred in affirming the decision of the court below to the effect that the Jersey Blue vein crosses
1870 the Rainbow vein on strike or dip.

XIII.

The Circuit Court of Appeals erred in affirming the decision of the said District Court to the effect that the apex of the easterly strand of the Rainbow vein in the Black Rock claim did not cross the easterly end line of the Black Rock claim and terminates at a point within said claim about 250 feet west of the Black Rock east end line.

XIV.

The Circuit Court of Appeals erred in affirming the decree of the District Court to the effect that prior to the Black Rock location both the Rainbow vein and the Jersey Blue vein at their apices were discovered and known within the Black Rock claim and that their apices appeared as a continuous east-west vein.

XV.

The said Circuit Court of Appeals erred in affirming the decision of the District Court to the effect that plaintiffs were entitled to parts of the ore bodies in controversy.

XVI.

The Circuit Court of Appeals erred in affirming the decision of the District Court to the effect that the so-called Pyle strand or vein at its top or apex, or any part of its top or apex, within the surface boundaries of the Elm Orlu claim, extended downward vertically.

XVII.

The said Circuit Court of Appeals erred in affirming the
1871 decision of the District Court to the effect that the Elm Orlu claim or location was prior in right or in time to the Black Rock claim or location or to the Jersey Blue claim or location.

XVIII.

The Circuit Court of Appeals erred in not deciding that the Jersey Blue claim was prior in time and in right to the Elm Orlu claim.

XIX.

The Circuit Court of Appeals erred in not deciding that the Black Rock claim or location was prior in time and in right to the Elm Orlu claim or location.

XX.

The Circuit Court of Appeals erred in affirming the decision of the District Court to the effect that the so-called Jersey Blue vein is a distinct vein from the so-called Black Rock or Rainbow vein and not a branch or portion thereof.

XXI.

The Court erred in affirming the decision of the District Court to the effect that the plaintiffs are entitled to a portion of the Creden vein.

XXII.

The said Circuit Court of Appeals erred in not holding and deciding that plaintiffs-appellees are not entitled to any part of the Elm Orlu or Rainbow vein, except that portion of the vein lying west of a vertical plane parallel to the west end line of the Elm Orlu drawn through a point on the northerly side line of the Elm
1872 Orlu *drawn through a point on the northerly side line of the Elm Orlu* claim, 190 feet easterly of the southwest corner of the Black Rock claim, and then to the extent, and only to the extent, that the said Elm Orlu or Rainbow vein remains separate and distinct from and unaffected by the veins or ore bodies apexing in said Black Rock and Jersey Blue claims, beyond which all should have been decreed to the defendant-appellant.

XXIII.

The Circuit Court of Appeals erred in not holding and deciding that the plaintiffs were not entitled to any vein, lode or ledge, or any portion of any vein, lode or ledge, or any portion of any ore bodies within the vertical boundaries of the Black Rock claim.

XXIV.

The Circuit Court of Appeals erred in not holding and deciding that the plaintiffs were not entitled to any vein, lode or ledge, or any portion of any vein, lode or ledge, or to any portion of any ore bodies within the vertical lines of the Jersey Blue claim.

XXV.

The said court erred in not holding and deciding that the defendant was entitled to all the ore bodies, veins and ledges within the vertical boundaries of the said Black Rock and Jersey Blue claims.

XXVI.

The said court erred in not holding and deciding that the
1873 defendant-appellant was entitled to all of those certain veins variously called the Rainbow, Black Rock and Jersey Blue veins throughout the entire length of said vein or veins by whatever name called within the said Jersey Blue and Black Rock claims, and throughout their entire depth.

XXVII.

The said court erred in not ordering a decree in favor of the defendant-appellant, except as to that portion of the Rainbow lode lying west of a vertical plane parallel to the west end line of the Elm Orlu claim drawn through a point on the south side line of the Black Rock claim, 190 feet east of the southwest corner of said claim, and so long, and only so long, as the said Rainbow vein remains distinct and separate from the veins or ore bodies apexing in said Black Rock and Jersey Blue claims, beyond which all should have been ordered decreed to said defendant.

XXVIII.

The said court erred in affirming the judgment of the District Court decreeing that the plaintiffs were entitled to a money recovery, as stated in the decree entered in said District Court, but in this connection the appellant states that if the plaintiffs were entitled to a recovery or to an accounting upon the basis of the decree made in the District Court in this case, then the amount found by the said District Court would be correct upon the assumption just stated, but appellant contests the right of the plaintiff to any recovery
1874 at all. The appellant raises no question hereby as to the amount but does question the right to recovery at all or to have an accounting at all.

XXIX.

The said Circuit Court of Appeals erred in not holding and deciding that the plaintiffs were estopped to assert any title to any vein or ore body in the Black Rock claim by virtue of the deed made, executed and delivered by the plaintiffs' predecessors in interest to the predecessor in interest of said defendant, and in affirming the decree of the District Court in this respect.

XXX.

The said Circuit Court of Appeals erred in not holding and deciding that the plaintiffs were estopped to assert title to any portion of any vein or ore body in the said Black Rock claim easterly of a vertical plane parallel to the west end line of the Elm Orlu drawn through a point on the north side line of the Elm Orlu claim, 190 feet easterly of the southwest corner of the Black Rock claim by reason of the deed made, executed and delivered by the plaintiffs' predecessor in interest to the predecessor in interest of the defendant, and in affirming the degree of the District Court in this respect.

XXXI.

The said Circuit Court of Appeals erred in not holding and deciding that the plaintiffs were estopped to assert title to any
1875 portion of any vein in the Black Rock claim easterly of a vertical plane parallel to the west end line of the Elm Orlu claim, drawn through a point on the north side line of said claim, 301 feet easterly of the southwest corner of the Black Rock claim by reason of the deed made, executed and delivered by the plaintiffs' predecessor in interest to the predecessor in interest of the defendant.

XXXII.

The said Circuit Court of Appeals erred in not holding and deciding that the location notice of the Elm Orlu claim should not have been admitted in evidence, and in affirming the order and ruling of the District Court overruling the defendant's objection thereto; said location notice is in words and figures as follows:

"Elm Orlu.

Summit Valley Mining District,

Deer Lodge County, M. T.

Notice is hereby given that M. McNamee, Chas. E. Savage and I. C. Burkett have this 18th day of April, A. D. 1875, located the Elm Orlu Lode bearing gold, silver and other metals under the provisions of the act of Congress of May 10, 1872, situated in the mining district aforesaid, and described as follows, to wit: Beginning at the East line of the Poe Lode, thence running along the lode Easterly fifteen hundred feet, together with three hundred feet of surface ground on each side of the center of the vein and marked at each corner by stone mounds. The Discovery post is three hundred feet Easterly from the beginning. The Claimants adjoining are I. W. Barnard & Co. on the West and Anson Ford on the East.

C. E. SAVAGE.

TERRITORY OF MONTANA,
County of Deer Lodge, ss:

1876 On this 19th day of April, A. D. 1875, personally appeared before me the undersigned, a Justice of the Peace in and for said County, Charles E. Savage and made oath that he and M. McNamee and I. C. Burkett are of lawful age, citizens of the United States, and that the above notice is substantially a copy of the original notice of location of the claim above described, as posted thereon.

ANSON FORD, *J. P.*"

XXXIII.

The said Circuit Court of Appeals erred in not deciding that the Black Rock claim was prior in point of right to the Elm Orlu claim; for the additional reason that the Black Rock claim was entered in the United States Land Office before the Elm Orlu claim was entered therein, and that the Black Rock claim was purchased from the United States Government before the Elm Orlu claim, and that it included the area in conflict, and in affirming the decision of the District Court in this respect.

XXXIV.

The Circuit Court of Appeals erred in not overruling the order and ruling of the District Court admitting in evidence the copy of the record from the Land Office upon the application for patent of the claims of the Elm Orlu claim, and overruling defendant's objection thereto. The said record includes the field notes of the surveyor upon the application for patent, the certificate of the Surveyor General, the statement of fees and charges and abstract of title of the said claim, which refers to the record of the said location notice and to various transfers, a copy of the said location notice, which

1877 notice already appears in these specifications, to-wit: in specification XXXII, and application for patent by Michael McNamee, dated the 30th day of September, 1882, in which reference is made to the said location notice and to the abstract of title aforesaid. The said copy of the record also contains sundry other papers, to-wit, the papers usually accompanying an application for patent for a mining claim.

XXXV.

The Circuit Court of Appeals erred in affirming the decision of the District Court to the effect that the alleged Pyle strand diverges from the Rainbow vein at some point within the Elm Orlu claim.

XXXVI.

The Circuit Court of Appeals erred in affirming the decision of the District Court to the effect that plaintiffs owned all ore bodies in

the Rainbow vein between the Elm Orlu west end and a parallel line projected where the south wall of the apex of said vein crosses the common side line, or about 980 feet of said vein.

XXXVII.

The Circuit Court of Appeals erred in not holding and decreeing that the defendant owns all ore bodies in the Rainbow vein easterly of a plane parallel to the west end line of the Elm Orlu claim drawn through a point on the northerly side line of said claim, 190 feet easterly of the southwest corner of the Black Rock claim and
1878 extended indefinitely in its own direction.

XXXVIII.

The said Circuit Court of Appeals erred in affirming the decree of the District Court to the effect that the plaintiffs own part of the alleged Pyle strand and some of the ore bodies therein.

XXXIX.

The said Circuit Court of Appeals erred in not holding and deciding that the plaintiffs do not own any part of the alleged Pyle strand or any ore body within said strand or vein lying within the vertical boundaries of the Black Rock claim.

XXXX.

The Circuit Court of Appeals erred in affirming the decree of the District Court to the effect that the so-called Jersey Blue vein on strike or dip intersects or crosses the Rainbow vein and that the plaintiffs were entitled to all of the ores in the alleged space of intersection of the Jersey Blue vein with the Rainbow vein and in not holding and deciding that there was a junction of the said veins.

XXXXI.

The Circuit Court of Appeals erred in not holding and deciding that the plaintiffs do not own any part of the Creden vein, and in affirming the decree of the District Court to the effect that the plaintiffs do own parts of the said Creden vein as described in said decree.

1879 XXXXII.

The said Circuit Court of Appeals erred in not holding and deciding that the plaintiffs were not entitled to an account.

Wherefore, appellant prays that the said decision and decree be reversed and that the said Circuit Court of Appeals for the Ninth

Circuit be ordered to enter a decision and decree reversing the decree of the lower court in said cause.

W. H. DICKSON,
J. BRUCE KREMER,
WM. SCALLON,
RUFUS THAYER,
Solicitors for Appellant.

[Endorsed:] Assignment of Errors. Filed May 16, 1918. F. D. Monckton, Clerk.

1880 United States Circuit Court of Appeals for the Ninth Circuit.

No. 2939.

BUTTE & SUPERIOR COPPER COMPANY, LIMITED, a Corporation, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees.

Order Allowing Appeal.

The petition of appellant herein that an appeal be allowed to the Supreme Court of the United States having been duly filed and presented on the 20th day of May, 1918, and the same having been under advisement and fully considered, it is on this 16th day of July, 1918, hereby ordered that an appeal to the Supreme Court of the United States from the decree heretofore filed and entered herein be and the same is hereby allowed, and that a certified transcript of the record, testimony, exhibits, and all proceedings be forthwith transmitted to said Supreme Court of the United States. It is further ordered that the bond on appeal be fixed at the sum of Two Hundred and Fifty Thousand Dollars ($250,000), the same to act as a supersedeas bond and also as a bond for cost and damages on appeal.

Dated: San Francisco, California, July 16, 1918.

WILLIAM H. HUNT,
Judge of the United States Circuit Court of Appeals.

[Endorsed:] Order Allowing Appeal. Filed July 16, 1918. F. D. Monckton, Clerk.

1881 United States Circuit Court of Appeals for the Ninth Circuit.

BUTTE & SUPERIOR COPPER COMPANY, LIMITED, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY and ELM ORLU MINING COMPANY, Appellees.

Bond on Appeal.

Know all men by these presents:

That the undersigned, Butte & Superior Copper Company, as Principal, and National Surety Company, a corporation created and existing under and by virtue of the laws of the State of New York and qualified by law to execute this bond, as Surety, are held and firmly bound unto the Clark-Montana Realty Company and Elm Orlu Mining Company in the sum of Two Hundred Fifty Thousand Dollars ($250,000), lawful money of the United States, to be paid to them and to their respective successors; to which payment, well and truly to be made, we bind ourselves, and each of us, jointly and severally, and each of our successors, by these presents, sealed with our seals and dated this 17th day of July, 1918.

Whereas, the above named Butte & Superior Copper Company has taken an appeal to the Supreme Court of the United States to reverse the judgment of the Circuit Court of Appeals of the Ninth Circuit in the above entitled cause:

Now, therefore, the condition of this obligation is such that if the above named Butte & Superior Copper Company shall prosecute its said appeal to effect and answer all costs and damages if it
1882 shall fail to make good its appeal, then this obligation shall be void, otherwise to remain in full force and virtue.

BUTTE & SUPERIOR COPPER COMPANY, LIMITED,
By RUFUS THAYER, *Its Attorney.*

[SEAL.] NATIONAL SURETY COMPANY,
By SIDNEY M. EHRMAN,
Resident Vice-President.

Attest:
F. J. CRISP,
Resident Asst. Secretary.

Approved this 18th day of July, 1918.

WM. H. HUNT,
Judge of the United States Circuit Court of Appeals, Ninth Circuit.

The premium on this bond is $250.00 per annum.

$2.50 Documentary Internal Revenue Stamps.

[Endorsed:] Bond on Appeal. Filed July 18, 1918. F. D. Monckton, Clerk.

1883 United States Circuit Court of Appeals for the Ninth Circuit.

BUTTE & SUPERIOR COPPER COMPANY, LIMITED, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY and ELM ORLU MINING COMPANY, Appellees.

Citation on Appeal.

UNITED STATES OF AMERICA, ss:

To Clark-Montana Realty Company and Elm Orlu Mining Company, Greeting:

You are hereby cited and admonished to be and appear at the Supreme Court of the United States, to be held at the city of Washington, in the District of Columbia, on the fourteenth day of September, A. D. 1918, pursuant to an order allowing an appeal filed and entered in the clerk's office of the Circuit Court of Appeals of the United States for the Ninth Circuit from a final decree signed, filed, and entered on the eighteenth day of February, 1918, in that certain suit, being No. 2939, wherein Butte & Superior Copper Company, Limited, is appellant and you are appellees, to show cause, if any there be, why the decree rendered against the said appellant, as in said order allowing appeal mentioned, should not be corrected and why justice should not be done to the parties in that behalf.

Dated July 19, 1918.

WM. H. HUNT.
Judge of the United States Circuit Court of Appeals, Ninth Circuit.

Service of the foregoing citation acknowledged and copy thereof received this 22nd day of July, 1918. W. A. Clark, Jr., John P. Gray, John L. Templeman, Solicitors and Counsel for Appellees.

[Endorsed:] Citation on Appeal. Filed July 26, 1918. F. D. Monckton, Clerk.

1884 United States Circuit Court of Appeals for the Ninth Circuit.

No. 2939.

BUTTE AND SUPERIOR MINING COMPANY, Designated as the Butte and Superior Copper Company, Limited, a Corporation, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees.

Stipulation.

It is hereby stipulated and agreed that in the preparation of the record for the Supreme Court of the United States upon the appeal in this case taken by said appellant, the clerk of the said Circuit Court of Appeals shall include the whole of the printed transcript of record and the book of exhibits on which the case was heard in the Circuit Court of Appeals, and that all of the exhibits not included in the said book of exhibits shall be transmitted as a part of the record with proper identification and certification thereof and in the record to be made up by the Circuit Court there shall also be included all of the proceedings in the said Circuit Court of Appeals.

Dated this 18th day of July, 1918.

(Sgd.) W. H. DICKSON,
(Sgd.) J. BRUCE KREMER,
(Sgd.) WM. SCALLON,
(Sgd.) RUFUS THAYER,
Solicitors for Appellee.
(Sgd.) W. A. CLARK, Jr.,
(Sgd.) JOHN P. GRAY,
(Sgd.) JOHN L. TEMPLEMAN,
Solicitors for Appellant.

[Endorsed:] Stipulation. Filed July 22, 1918. F. D. Monckton, Clerk.

1885 United States Circuit Court of Appeals for the Ninth Circuit.

No. 2939.

BUTTE AND SUPERIOR MINING COMPANY, Designated as the Butte and Superior Copper Company, Limited, a Corporation, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees.

Præcipe for Transcript of Record.

To the Clerk of the United States Circuit Court of Appeals for the Ninth Circuit.

SIR: Please prepare, certify and transmit the transcript of the record of the above entitled cause for the use of the Supreme Court of the United States upon the appeal in this cause, to-wit:

The printed transcript of record and the book of exhibits on which the case was heard in the Circuit Court of Appeals;

Together with the assignment of errors and all proceedings in the said Circuit Court of Appeals, and particularly

The opinion and decree of the said court;

The petition for rehearing and the order overruling the same;

The petition for appeal and all entries and orders relating to presentation and allowance of the same;

The bond on appeal and the supersedeas bond;

1886 The citation on appeal with proof of service.

The stipulation relating to the record and

This præcipe:

To-wit: all papers and proceedings in addition to the said record, requisite to be certified and transmitted to the Supreme Court of the United States upon an appeal, and transmit therewith all exhibits in the case, not included in the said book of exhibits, with proper identification and certification of the same.

(Sgd.) W. H. DICKSON,
" J. BRUCE KREMER,
" WM. SCALLON,
" RUFUS THAYER,
Solicitors for Appellant.

Service of the above præcipe and receipt of a copy thereof on this 18th day of July, 1918, is hereby acknowledged.

(Sgd.) W. A. CLARK, JR.,
" JOHN P. GRAY,
" JOHN L. TEMPLEMAN,
Solicitors for Appellees.

[Endorsed:] Præcipe for Transcript of Record. Filed July 22, 1918. F. D. Monckton, Clerk.

1887 United States Circuit Court of Appeals for the Ninth Circuit.

No. 2939.

BUTTE AND SUPERIOR MINING COMPANY, Designated as the Butte and Superior Copper Company, Limited, a Corporation, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY, a Corporation, and ELM ORLU MINING COMPANY, a Corporation, Appellees.

Certificate of Clerk U. S. Circuit Court of Appeals to Transcript of Record upon Appeal to the Supreme Court of the United States.

I, Frank D. Monckton, as Clerk of the United States Circuit Court of Appeals for the Ninth Circuit, do hereby certify the foregoing Eighteen Hundred and Eighty-six (1886) pages, numbered from and including 1 to and including 1886, contained in three volumes, marked respectively, Volume I, Volume II, and Volume III, to be a full, true and correct copy of the record made up pursuant to the præcipe filed by counsel for the appellant on the 22nd day of July, A. D. 1918, under Rule 8 of the Supreme Court of the United States, in the above-entitled cause, including the Assignment of Errors on Appeal to the Supreme Court of the United States and of all proceedings had, and of all papers filed, including the Opinion filed in the said Circuit Court of Appeals in the above-entitled case, as the originals thereof remain on file and appear of record in my office, and that the same, together with the accompanying original exhibits, viz: Plaintiffs' 1, 34, 36, 48, 51, 105, 109, 126, 130, 133 and 139; and Defendant's 45, 93, 94, 100, 102, 103, 106, 107, 108, 110, 111, 112, 113, 114, 115, 117, 118 and 119; and Book of Portion of Original Exhibits consisting of Exhibits Nos. 53 to 60 incl., 61, 62, 63, 120, 121, 124, 125, 127, 128, and 129, and the following exhibits in the custody of the United States Marshal at San Francisco, California, viz: Plaintiffs' 2-33, 35, 37-44, 46, 47, 49, 50, 52, 131, 132, 134, 135, 136, 137 and 138; and Defendant's 64-92, 95, 96, 97, 98, 99; 101, 104, 116, 122, 123, 124, constitute the transcript of record upon appeal to the Supreme Court of the United States in the above-entitled cause as made and certified pursuant to the said præcipe.

Attest my hand and the seal of the said the United States Circuit Court of Appeals for the Ninth Circuit, at the City of San Francisco, in the State of California, this 30th day of July, A. D. 1918.

[Seal United States Circuit Court of Appeals, Ninth Circuit.]

F. D. MONCKTON, *Clerk*.

1888 United States Circuit Court of Appeals, Ninth Circuit.

BUTTE & SUPERIOR COPPER COMPANY, LIMITED, Appellant,

vs.

CLARK-MONTANA REALTY COMPANY and ELM ORLU MINING COMPANY, Appellees.

Citation on Appeal.

UNITED STATES OF AMERICA, *ss:*

To Clark-Montana Realty Company and Elm Orlu Mining Company, Greeting:

You are hereby cited and admonished to be and appear at the Supreme Court of the United States, to be held at the city of Washington, in the District of Columbia, on the fourteenth day of September, A. D. 1918, pursuant to an order allowing an appeal filed and entered in the clerk's office of the Circuit Court of Appeals of the United States for the Ninth Circuit from a final decree signed, filed, and entered on the eighteenth day of February, 1918, in that certain suit, being No. 2939, wherein Butte & Superior Copper Company, Limited, is appellant and you are appellees, to show cause, if any there be, why the decree rendered against the said appellant, as in said order allowing appeal mentioned, should not be corrected and why justice should not be done to the parties in that behalf.

Dated July 19, 1918.

WM. H. HUNT,
Judge of the United States Circuit Court of Appeals, Ninth Circuit.

1889 Service of the foregoing citation acknowledged and copy thereof received this 22nd day of July, 1918.

W. A. CLARK, JR.,
JOHN P. GRAY,
JOHN. L. TEMPLEMAN,
Solicitors and Counsel for Appellees.

[Endorsed:] Docketed. No. 2939. United States Circuit Court of Appeals, Ninth Circuit. Butte & Superior Copper Company, Limited, Appellant, vs. Clark-Montana Realty Company and Elm Orlu Mining Company, Appellees. Citation on Appeal. Rufus Thayer, Attorney for Appellant, Hobart Building, San Francisco. Filed Jul 26, 1918. F. D. Monckton, Clerk.

Endorsed on cover: File No. 26,684. U. S. Circuit Court Appeals, 9th Circuit. Term No. 598. Butte & Superior Copper Company, Limited, appellant, vs. Clark-Montana Realty Company and Elm Orlu Mining Company. Filed August 8th, 1918. File No. 26,684.